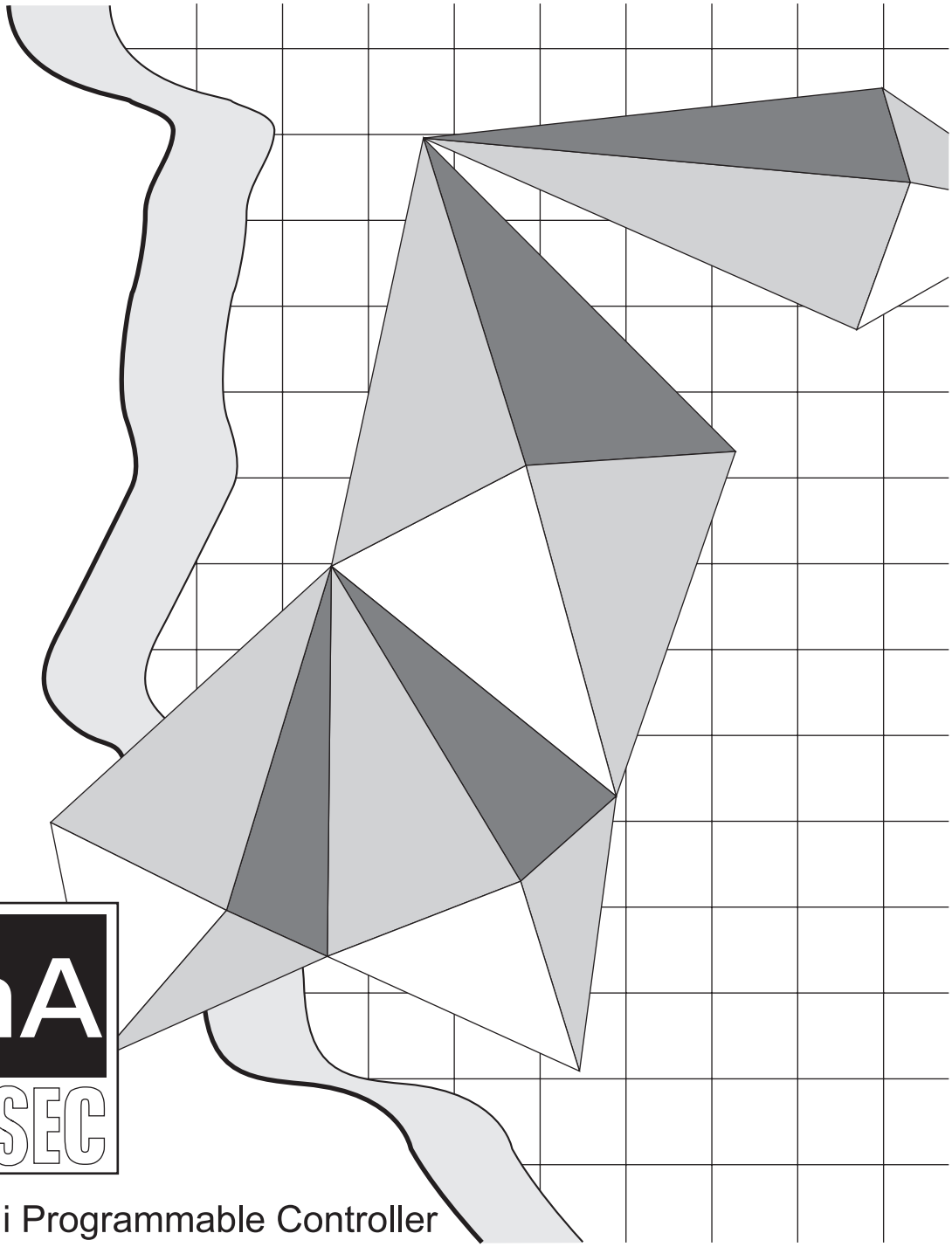
MITSUBISHI

QnA SERIES

CC-Link System Master/Local Module Type AJ61QBT11/A1SJ61QBT11

User's Manual



QnA

MELSEC

Mitsubishi Programmable Controller

• SAFETY PRECAUTIONS •

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.
These precautions apply only to this product.
Refer to the user's manual of the CPU module to use for a description of the programmable controller system safety precautions.
In this manual, the safety precautions are classified into two levels: "⚠WARNING" and "⚠CAUTION".

⚠WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠CAUTION" may lead to serious consequences.
Observe the precautions of both levels because they are important for personal and system safety.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[DESIGN PRECAUTIONS]

⚠WARNING

- For the operating status of each station after a data link failure, refer to Chapter 5 in this manual.
- The master station or local station cannot detect errors when a station specified as an error-invalidated station becomes communication error.

⚠CAUTION

- Do not install the control lines or communication cables together with main circuit lines or power cables. Keep distance of 100mm (3.9 inch) or more between them. Failure to do so may result in malfunction due to noise.

[INSTALLATION PRECAUTIONS]

⚠CAUTION

- Use the programmable controller in an environment that meets the specifications in the user's manual of the CPU module used. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.

[INSTALLATION PRECAUTIONS]

⚠CAUTION

- Insert the tabs at the bottom of the module into the holes in the base unit before mounting the module. (For the Q2AS series modules, tighten the screws to the base unit with the specified torque.)
  Incorrect mounting may cause malfunction, failure, or drop of the module.
- Shut off the external power supply for the system in all phases before mounting or removing the module.
  Failure to do so may result in damage to the product.
- Do not directly touch any conductive part of the module.
  Doing so can cause malfunction or failure of the module.

[WIRING PRECAUTIONS]

⚠WARNING

- Shut off the external power supply for the system in all phases before wiring. Failure to do so may result in electric shock or damage to the product.
- After wiring, attach the included terminal cover to the module before turning it on for operation.
  Failure to do so may result in malfunction.

⚠CAUTION

- Tighten the terminal screws within the specified torque range.
  Undertightening can cause short circuit, fire, or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Prevent foreign matter such as dust or wire chips from entering the module.
  Such foreign matter can cause a fire, failure, or malfunction.
- Do not install the control lines or communication cables together with the main circuit lines or power cables.
  Doing so may cause malfunctions due to noise.
- Place the cables in a duct or clamp them.
  If not, dangling cables may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- When disconnecting the cable from the module, do not pull the cable by the cable part. When removing the cable with a connector, hold the connector on the side that is connected to the module.
  When removing the cable without a connector, loose the screws on the side that is connected to the module.
  Pulling the cable that is still connected to the module may result in damage to the module or cable, or malfunction due to poor contact.

[WIRING PRECAUTIONS]

⚠CAUTION

- Use applicable solderless terminals and tighten them within the specified torque range.
  If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.

[STARTUP AND MAINTENANCE PRECAUTIONS]

⚠WARNING

- Do not touch any terminal while power is on.
  Doing so can cause electric shock.
- Shut off the external power supply for the system in all phases before cleaning the module or retightening the terminal screws or module fixing screws.
  Failure to do so may result in electric shock.
  Undertightening can cause drop of screw, short circuit, or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

⚠CAUTION

- Do not disassemble or modify the modules.
  Doing so may cause failure, malfunction, injury, or a fire.
- Shut off the external power supply for the system in all phases before mounting or removing the module.
  Failure to do so may cause the module to fail or malfunction.
- After the first use of the product, do not mount/remove the module to/from the base unit, and the terminal block to/from the module more than 50 times (IEC61131-2 compliant) respectively.
  Exceeding the limit of 50 times may cause malfunction.
- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body.
  Failure to do so may cause the module to fail or malfunction.

[DISPOSAL PRECAUTIONS]

⚠CAUTION

- When disposing of this product, treat it as industrial waste.

• CONDITIONS OF USE FOR THE PRODUCT •

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi representative in your region.

REVISIONS

*The manual number is noted at the lower left of the back cover.

Print Date	*Manual Number	Revision
Nov. 1996	IB (NA)-66722-A	First printing
Feb. 1997	IB (NA)-66722-B	Addition Section 3.2.1, 4.12.3, 13.2 Correction Chapter 1, Section 1.1, 3.2, 3.4, 8.3.2, 13.1, 13.5
Aug. 1997	IB (NA)-66722-C	Addition Section 1.1, 5.3.4, 5.4, Chapter 14, 15, 16 Correction Chapter 1, Section 1.4, 1.5, 2.1, 2.2, 2.2.3, 3.2, 3.2.1, 3.3, 4.1, 5.1, 7.1, 7.2.1, 7.3, 7.5, 7.6.1, 7.6.3, 7.6.4, 7.7.1, 7.7.2, 7.8
Jan. 1998	IB (NA)-66722-D	Additional model Section 1.4, 2.2.3 Addition Section 15.7 Correction Section 1.1, 3.3, 3.4.1, 3.5.1, 3.5.2, 4.3, 4.4, 4.5, 5.2, 8.3.1, 13.3, Chapter 14, 15.1, 15.2.1, 15.6, 15.6.4, 15.6.5, 16.2.3, App1.1, App1.2
Mar. 2000	IB (NA)-66722-E	Addition model Section 2.2.3 Addition Section 7.6, 7.6.1, 7.6.2, 15.8 Correction SAFETY PRECAUTIONS, Section 1.1, 1.5, 3.3, 3.5.1, 5.1, 5.2, 5.4.3, 7.3, 7.5, 8.3.2, 10.2.2, 12.2.2, 13.1, 13.3, 13.4.4, Chapter 14, Section 15.1, 15.2.1, 15.5.2, 15.5.4, 15.5.5, 15.6, 15.7, Chapter 16
Jul. 2000	IB (NA)-66722-F	Addition Section 2.2.4, 3.2.2 Correction Section 1.4, 2.2.1, 2.2.3, 3.2, 3.2.1, 3.4.2, 3.5.1, 7.3, 7.6.2, 7.7.3, 7.7.4, 8.3.1, 9.1.1, 10.1.1, 10.2.2, 11.1.1, 11.1.2, 12.1.1, 12.1.4, 15.2.1, App1.1, App1.2
Jul. 2001	IB (NA)-66722-G	Addition Section 8.2 Correction Section 2.2.3, 3.4.1, 3.4.2, 4.12.1, 5.4, 5.4.1, 5.4.2, 5.4.3, 7.2.1, 7.3, 7.5, 8.4.2, 9.2.1, 10.2.1, 11.2.1, 12.2.1, 13.1, 13.3, 13.4.2, 13.4.3, Chapter 14, Section 15.1, 15.2.1, 15.6, 15.8.1
Jul. 2003	IB (NA)-66722-H	Correction SAFETY PRECAUTIONS, About This manual, Section 2.2.3, 3.1, 3.3, 3.4.2, 3.5.1, 7.9, 10.2.1, 13.3, 15.2, 15.3, 15.10.1 to 15.10.3, 15.11.1 to 15.11.3

∗The manual number is noted at the lower left of the back cover.

Print Date	∗Manual Number	Revision
Apr. 2006	IB (NA)-66722-I	Addition Conformation to the EMC Directive and Low Voltage Instruction, Section 11.1 Correction SAFETY PRECAUTIONS, Chapter 1, Section 2.2.2, 2.2.4, 3.2, 4.1, 4.8, 6.3, 7.5, 8.4.2, 11.3.2, 13.3
Sep. 2007	IB (NA)-66722-J	Correction Section 1.4, 1.5, 2.1, 2.2.3, 3.5.2, 7.3, 8.4.1, 15.2.2, 15.7, App 1.2
Sep. 2009	IB (NA)-66722-K	"PLC" and "PC" were changed to "programmable controller". Correction SAFETY PRECAUTIONS, Compliance with the EMC and Low Voltage Directives, Chapter 1, Section 1.5, 2.2.4, 3.1, 3.3, 3.4.2, 7.2.1, 7.3, 7.5, 7.6.2, 13.3, 15.2.1, App 2
Nov. 2012	IB (NA)-66722-L	Addition CONDITIONS OF USE FOR THE PRODUCT Correction SAFETY PRECAUTIONS, Relevant Manuals, COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES, Chapter 1, Section 3.1, 3.5.1, 6.2, 7.3, 7.5, 7.7.3, 8.4.1, 8.4.2, 11.3.2, 13.3, 15.7

Japanese Manual Version SH-3604-M

INTRODUCTION

Thank you for purchasing the MELSEC-QnA Series programmable controller.
Before using the product, please read this manual thoroughly to gain an understanding of its functions so you can use it properly.
Please forward a copy of this manual to the end user.

CONTENTS

MANUAL

The following manuals are to this product.
Order as needed, referring to the table below.

Relevant Manuals

Manual Name	Manual No. (Model code)
SW2IVD/NX-GPPQ GPP Function Software Package Operating Manual (Offline Version) Describes the offline function of program creation method, print out method and file maintenance, etc. on the SW2NX-GPPQ/SW2IVD-GPPQ. (Same package)	IB-66775 (13J922)
SW2IVD/NX-GPPQ GPP Function Software Package Operating Manual (Online Version) Describes the online function of monitor method and debugging method, etc. on the SW2IVD-GPPQ/SW2NX-GPPQ. (Same package)	IB-66774 (13J921)
GX Developer Version 8 Operating Manual Explains the functions of GX Developer, such as the programming, printout, monitoring and debugging methods. (Sold separately)	SH-080373E (13JU41)
QnACPU Programming Manual (Common Instructions) Describes how to use sequence instructions, basic instructions and application instructions. (Sold separately)	SH-080810ENG (13JW11)
QnACPU PROGRAMMING MANUAL (Special Functions) Describes dedicated instructions used in the Q2ACPU(S1), Q3ACPU, and Q4ACPU special-function modules. (Sold separately)	IB-66616 (13JF48)

COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

(1) For programmable controller system
To ensure that Mitsubishi programmable controllers maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to one of the following manuals.
• User's manual for the CPU module used
• User's manual (hardware) for the CPU module or base unit used

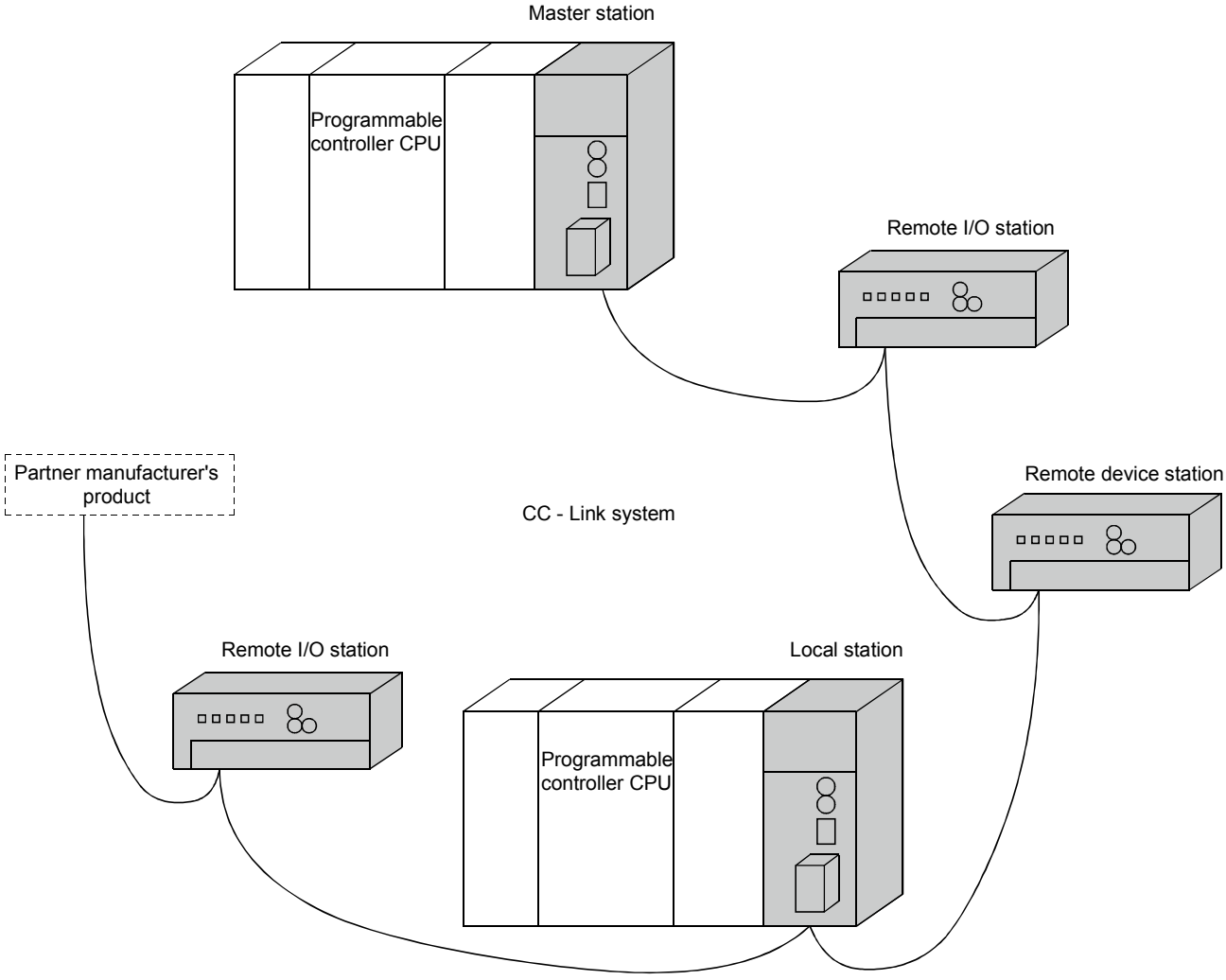
(2) For the product
To ensure that this product maintains EMC and Low Voltage Directives, please refer to one of the manuals listed under (1).

MEMO

1. OVERVIEW

The CC-Link system is a system that connects distributed modules such as I/O modules, intelligent function modules, and special function modules using dedicated cables so that these modules can be controlled by a programmable controller CPU. This chapter describes outline of the CC-Link.

① By distributing each module to the equipment device such as the conveyor line and machine devices, the wiring conservation of the entire system can be accomplished.
② Simple, high-speed communication can be accomplished with modules that handle on/off data such as I/O or numeric data.
③ By connecting multiple programmable controller CPUs, a simple distributed system can be configured.
④ Connections can be made to different types of devices made by partner manufacturers, giving flexibility to the system.



Master station..... Station which controls the remote I/O station, remote device station, and local stations
Remote I/O station ..... Remote station which handles only on/off data
Remote device station ..... Remote station which handles both on/off data and numeric data
Local station ..... Station which has a CPU and can communicate with the master station and other local stations

When applying any of the program examples to the actual system, examine the applicability and confirm that it will not cause system control problems.
After unpacking, please check that the following components are included.

Product name		Quantity
AJ61QBT11 CC-Link System Master/Local Module (discontinued on September 2008)	AJ61QBT11	1
	AJ61QBT11 CC-Link System Master/Local Module User's Manual (Hardware)	1
	Terminating resistor (110 Ω, 1/2 W) (All brown)	2
	Terminating resistor (130 Ω, 1/2 W) (brown, orange, brown)	2
A1SJ61QBT11 CC-Link system Master/Local Module	A1SJ61QBT11	1
	A1SJ61QBT11 CC-Link System Master/Local Module User's Manual (Hardware)	1
	Terminating resistor (110 Ω, 1/2 W) (All brown)	2
	Terminating resistor (130 Ω, 1/2 W) (brown, orange, brown)	2

1.1 How to Use This Manual

The master/local module has the following functions added from the function version B or later. The detailed descriptions of the additional functions are provided in Chapter 14 or later.

(1) Scan synchronous function
Link scan can be executed synchronized with the sequence scan.

(2) Standby master function
With this function, the data link can be continuously executed even if an error occurs in the master station, by automatically switching to the standby master station.

(3) Dedicated instructions
Transient transmission with the intelligent device and local station is possible. In addition, read/write of data with handshake to/from the remote device is feasible.

(4) Temporary error invalid station specification function
By specifying the corresponding remote station as a temporary error invalid station, an error is not detected even if the module is replaced while in communication.

(5) Parameter registration function
Parameters such as total number of connected stations and station information can be set using dedicated instructions.

(6) Automatic refresh function
Data transferred by cyclic transmissions, such as RX and RY, can be refreshed by the END processing to a desired device, when set up with the dedicated instruction.

(7) Monitor/diagnosis function
Monitoring and diagnosing can be performed from a peripheral device.

(8) Online test function
Line testing and control of link such as starting up and stopping can be performed from a peripheral device.

(9) Communication instruction (software version J manufactured in Jan., 1998 or later)
Data communication with other stations is possible. Data read/write with other stations is also possible.

(10) Dedicated instruction (software version J manufactured in Jan., 1998 or later)
Device read/write with respect to the CPU of the specified station are possible.

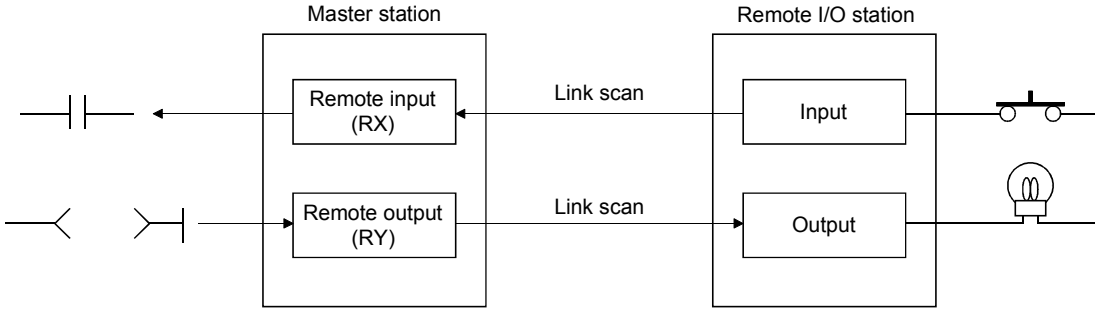
(11) Remote I/O net mode (software version P manufactured in Sep., 1998 or later)
When the system is configured only with the master station and the remote I/O stations, the setting of the network parameters is eliminated and the link scanning time is shortened by the use of the remote I/O net mode.

1.2 Characteristics

The characteristics of the CC-Link are described below:

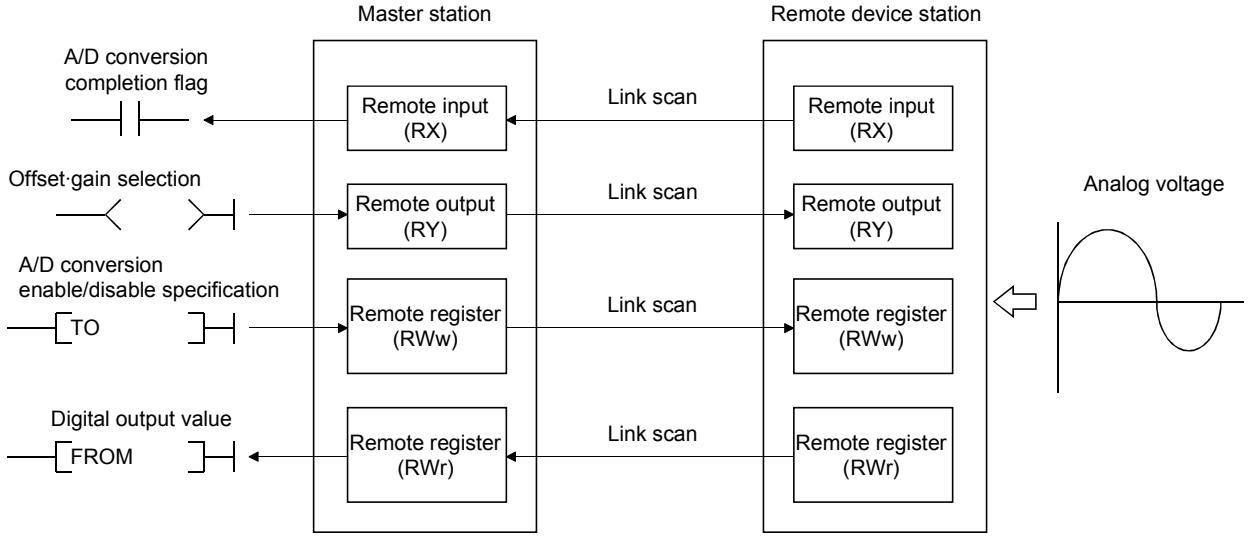
(1) Remote I/O station communication

The communication is performed with only on/off data (remote input RX and remote output RY).



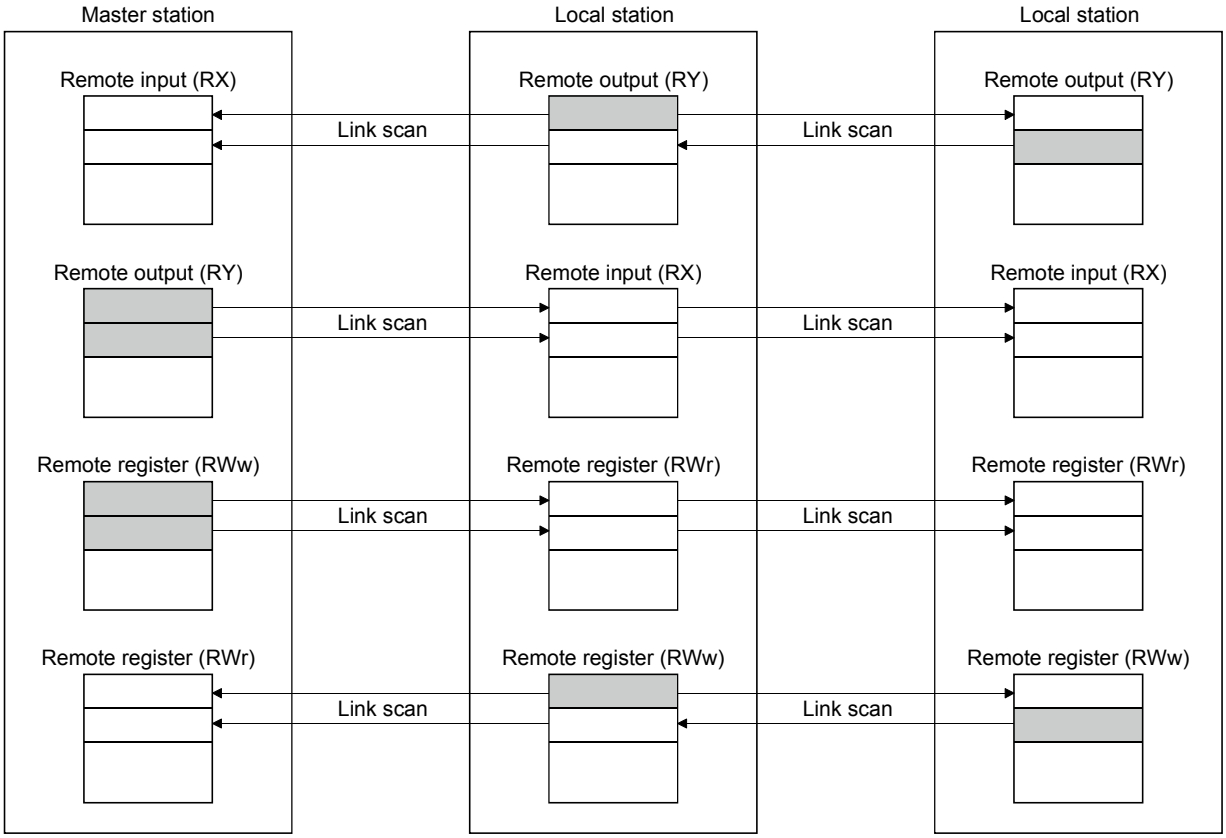
(2) Remote device station communication

The communication is performed with on/off data (remote input RX and remote output RY) and numeric data (remote register).



(3) Local station communication

The data communication between programmable controller CPUs can be performed in N:N relationship with bit data (remote input RX and remote output RY) and word data (remote register)



(4) Establishing high-speed transmission

When the transmission speed of 10Mbps is set, the link scan time (communication time with the master station and remote station/local station) is still at high speed, even when the maximum 64 stations are connected.

- Remote I/O (RX, RY) 2048 points ..... 4 ms
- Remote I/O (RX, RY) 2048 points
  + remote register (RWw, RWr) 512 points ..... 7 ms

(5) System configurations are possible, according to requirements.

(a) Transmission distance

The total extended distance depends on the transmission speed, but connections can be made between 100 m (at 10 Mbps) and 1.2 km (at 156 kbps).

(b) Number of connected stations

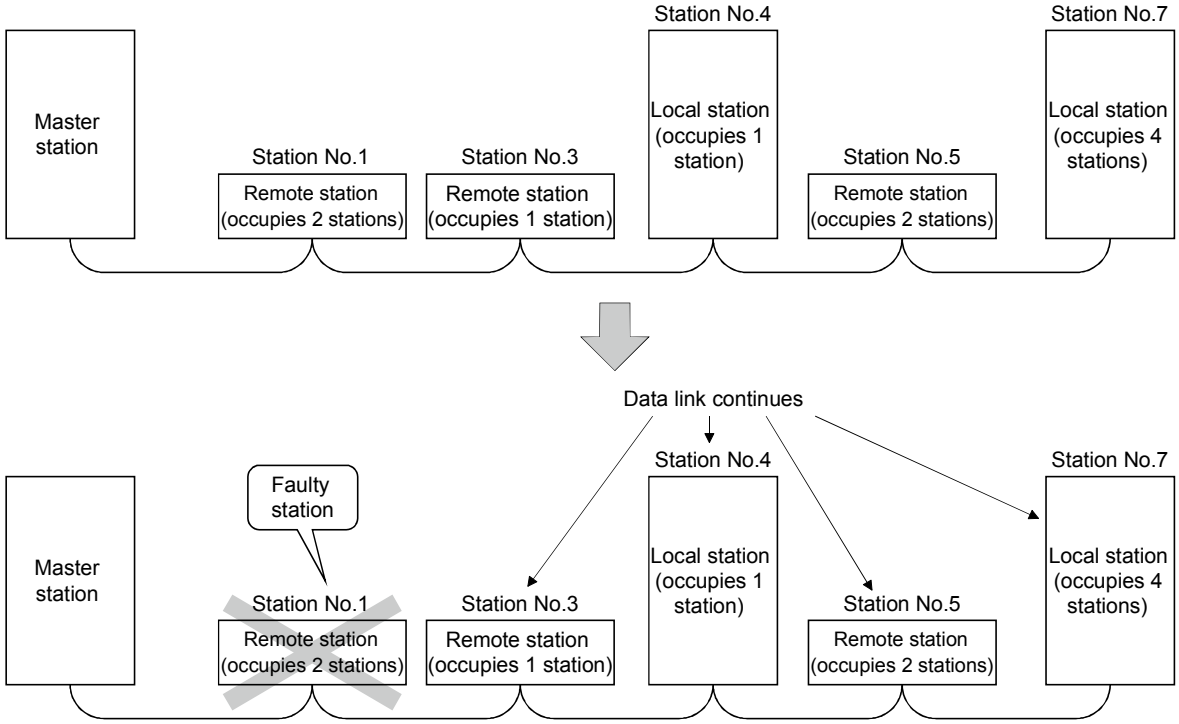
A maximum of 64 stations, including remote I/O stations, remote device stations, and local stations can be connected to one master station.
Up to 64 remote I/O stations, 42 remote device stations, and 26 local stations can be connected. (Refer to Section 2.1.)

(6) Link points

2048 points of remote input (RX), 2048 points of remote output (RY), and 512 points of remote register (RW) can be used for communication in one system.
For one remote station or local station, 32 points of remote input (RX), 32 points of remote output (RY), and 8 points of remote register (RW) (RWw: 4 points, RWr: 4 points) can be handled.

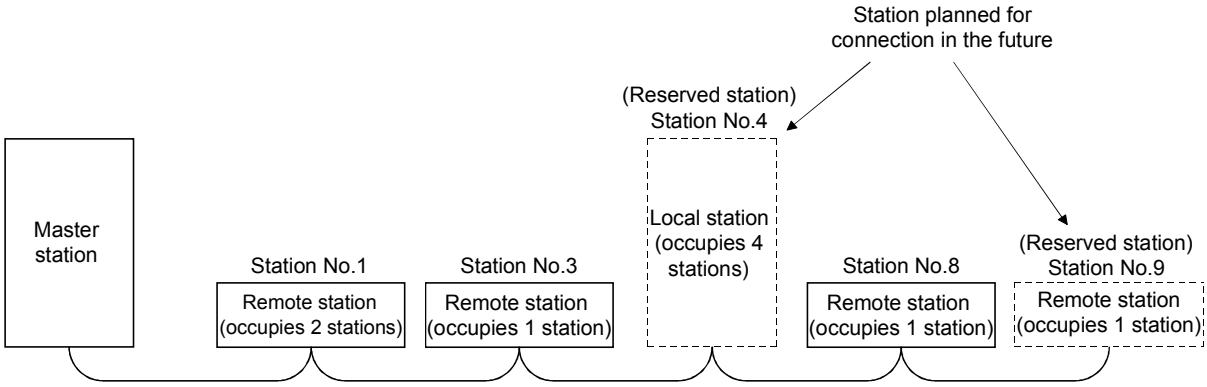
(7) System down prevention (Station cutoff function)

Because the system employs the bus method, even if there is a remote station or local station which goes down due to power off, etc., it won't affect the communication with other functioning remote/local stations.
Also, for the module using with the 2-piece terminal block, the module can be replaced during data link.



(8) Reserved station function

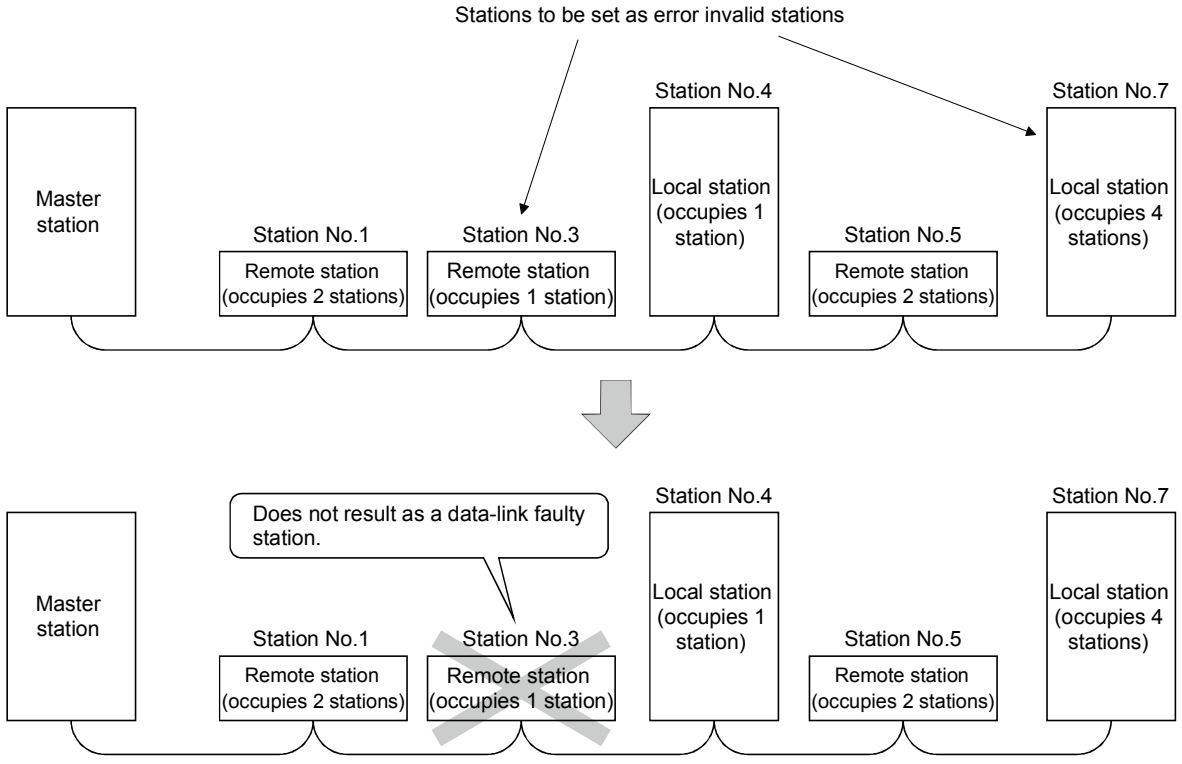
By setting the station which is not actually connected (station planned for connection in the future) as a reserved station, the station will not be handled as a faulty station.



(9) Error invalid station function

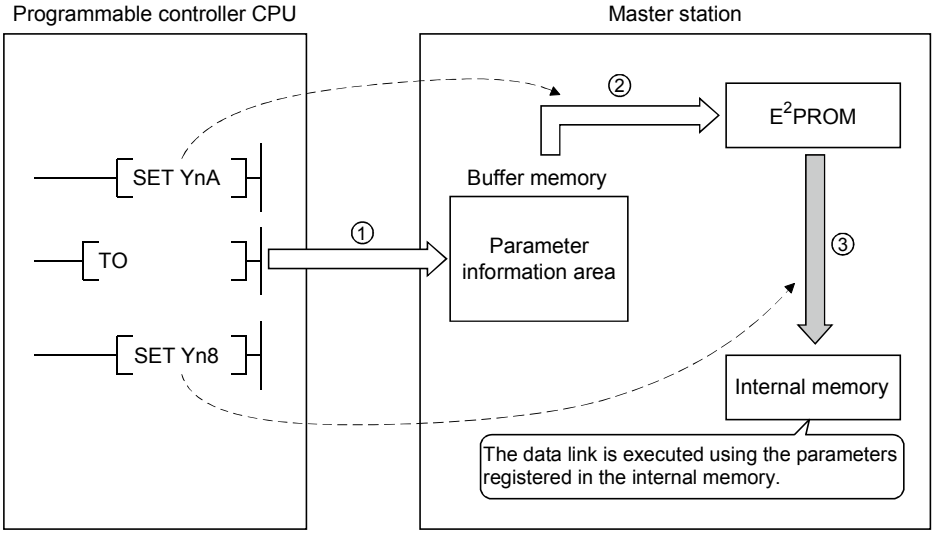
A station that cannot perform data links because the power is turned off, etc., can be handled as other than a "data-link faulty station" on the master station and the local station.

Be careful, however, for errors will not be detected.



(10) Parameter registration to the E^2PROM

By registering the parameters to the E^2PROM, the parameter settings do not have to be performed at each master station startup (power off → on).
Because this is the E^2PROM, parameters are stored even if the module's power is turned off.



(11) Data-link status setting for when a master station programmable controller CPU error occurs

The data-link status can be set (stop/continue) to either stop or continue for when a "operation stop error" occurs at the master station's programmable controller CPU, such as SP. UNIT ERROR.
The data link between local stations can be continued.
"Operation continue errors" such as a BATTERY ERROR continue the data link regardless of the setting.

(12) Input data from data-link faulty station status setting

The data input (received) from the data-link faulty station can be cleared or kept (status right before an error is caused).

(13) Module reset function from the sequence program

When the switch setting is changed or an error occurs in the module, the module can be reset from the sequence program without resetting the programmable controller CPU.
(This excludes when the module has a module faulty (Xn0 is on).)

(14) RAS function

(a) Automatic return function

When a station is disconnected from the link due to power off, etc., and returns to the normal status, the station can join the data link again automatically.

(b) Link status check

Using the link special relay (SB) and link special register (SW) in the buffer memory, the current data-link status can be checked.

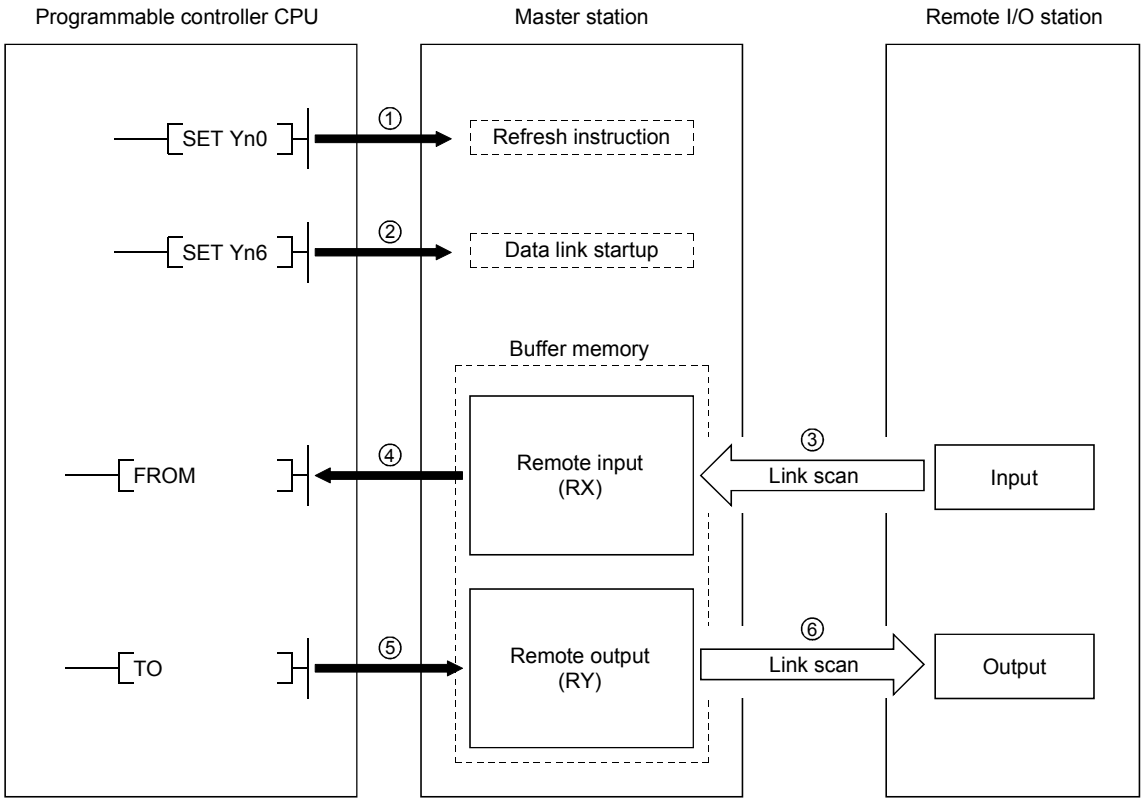
(c) Diagnosis function

Using the switch setting, the hardware and cable conditions can be checked.

1.3 Communication Overview

1.3.1 Communication between the master station and remote I/O station

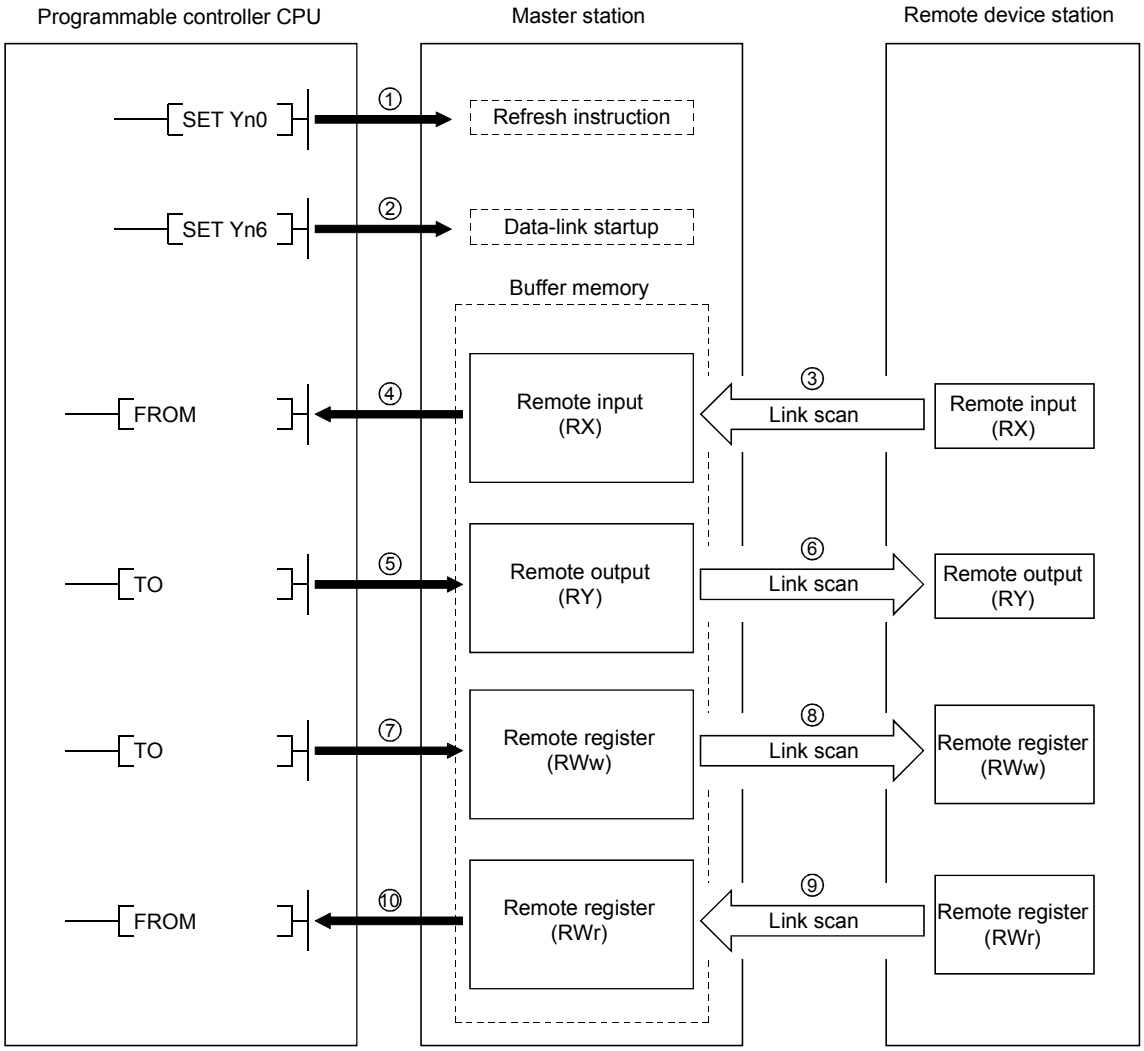
The overview of the communication between the master station and remote I/O station is described below.
Refer to Section 4.2 for details.



① Turn on the refresh instruction.
② Startup the data link.
③ By the link scan, the remote I/O station's input information is stored in the master station's remote input (RX).
④ By the FROM instruction, read from the remote input (RX).
⑤ By the TO instruction, write the on/off data to the remote output (RY).
⑥ By the link scan, the remote I/O station's output is turned on/off.

1.3.2 Communication between the master station and remote device station

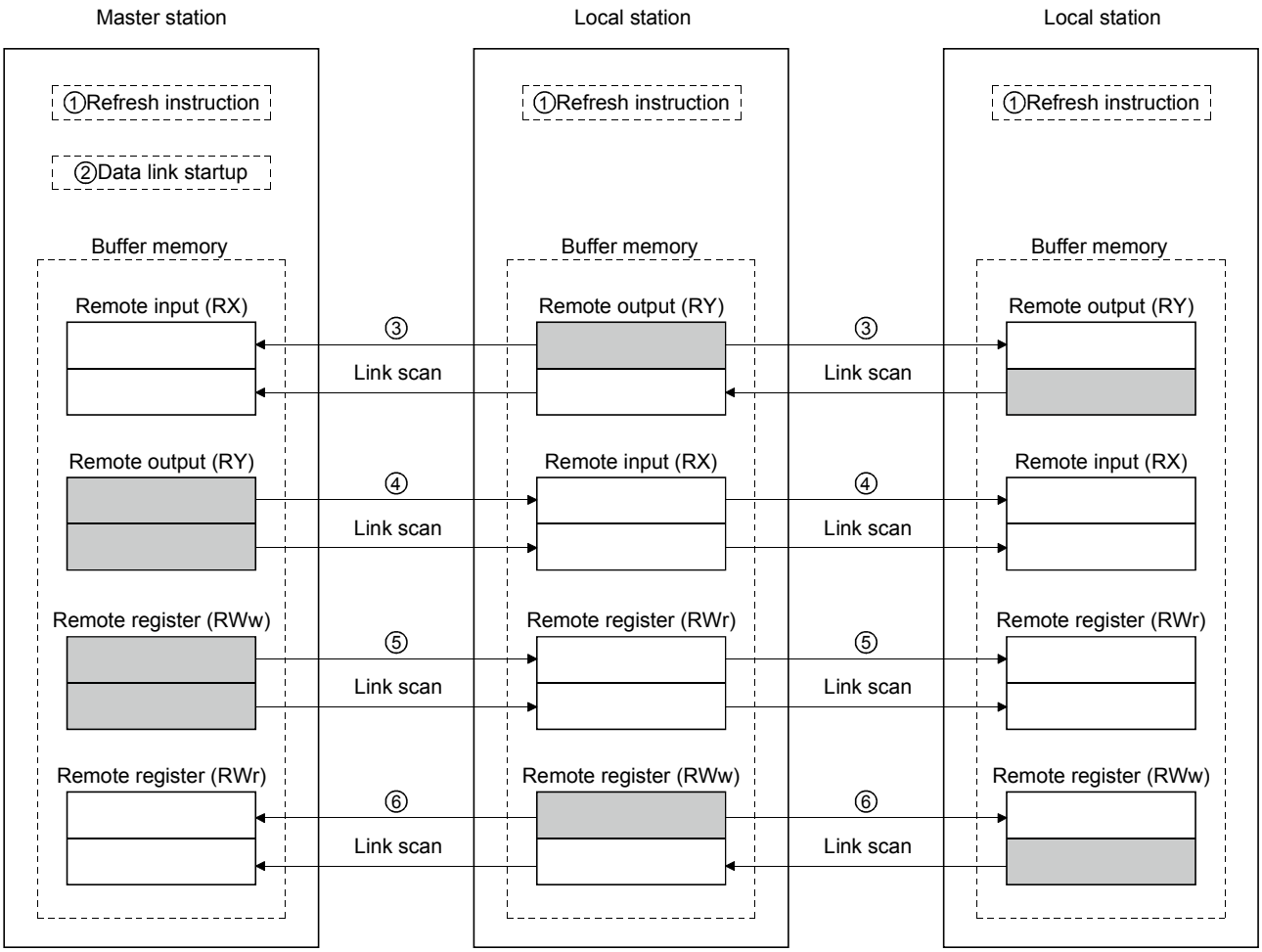
The overview of the communication between the master station and remote device station is described below.
Refer to Section 4.3 for details.



① Turn on the refresh instruction.
② Startup the data link.
③ By the link scan, the remote device station's remote input (RX) is stored in the master station's remote input (RX).
④ By the FROM instruction, read data from the remote input (RX).
⑤ By the TO instruction, write data to the remote output (RY).
⑥ By the link scan, the remote device station's remote output (RY) is turned on/off.
⑦ By the TO instruction, write data to the remote register (RWw).
⑧ By the link scan, the data is sent to the remote device station's remote register (RWw).
⑨ By the link scan, the remote device station's remote register (RWr) is sent to the master station's remote register (RWr).
⑩ By the TO instruction, read data from the remote register (RWr).

1.3.3 Communication between the master station and local station

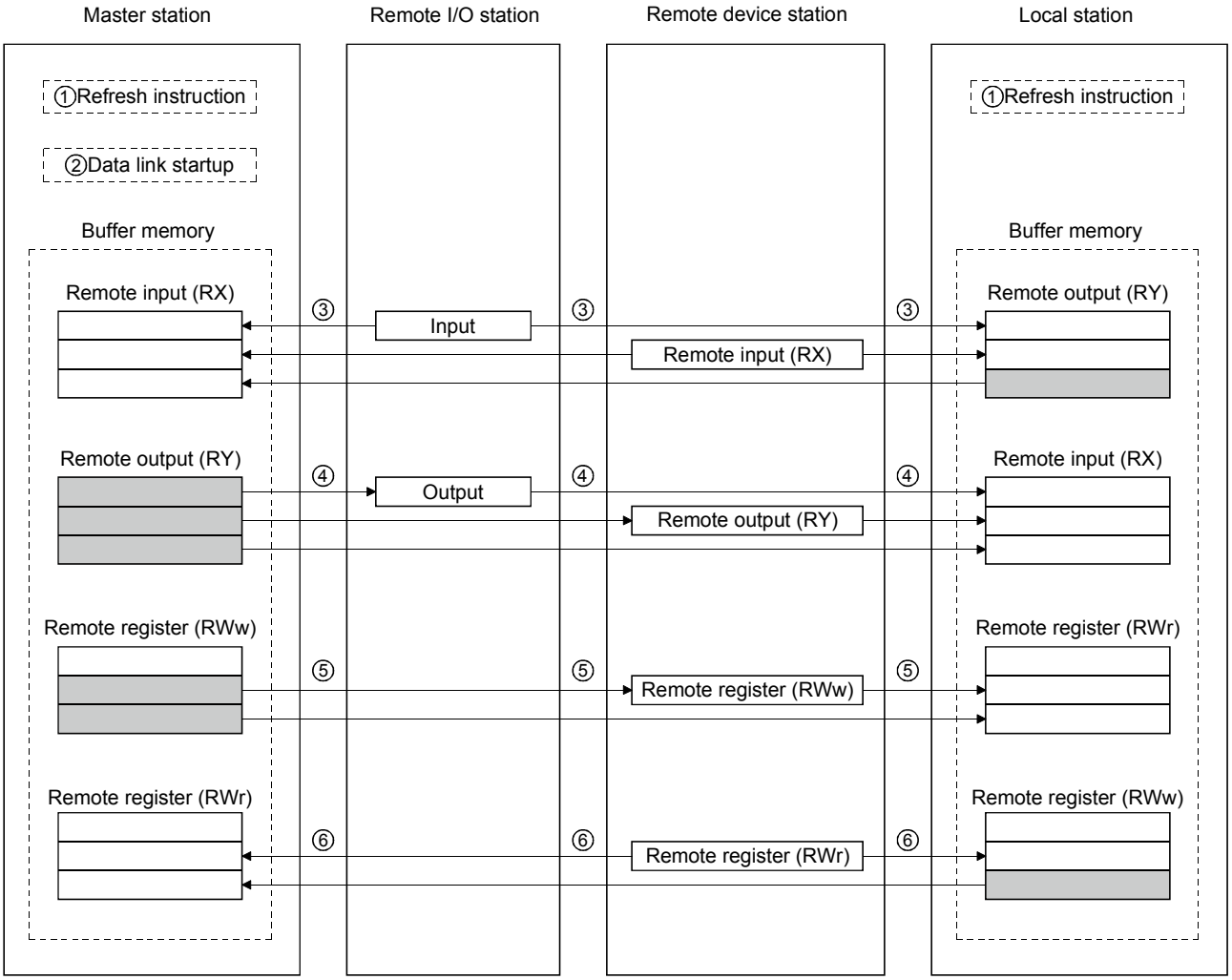
The overview of the communication between the master station and local station is described below.
Refer to Section 4.4 for details.



① Turn on the refresh instruction.
② Startup the data link.
③ By the link scan, the data in the local station's remote output (RY) is sent to the master station's remote input (RX) and other local stations' remote output (RY).
④ By the link scan, the data in the master station's remote output (RY) is sent to all local station's remote input (RY).
⑤ By the link scan, the data in the master station's remote register (RWw) is sent to all local stations' remote register (RWr).
⑥ By the link scan, the data in the local station's remote register (RWw) is sent to the master station's remote register (RWr) and other local stations' remote register (RWw).

1.3.4 Compound system communication

The overview of compound system communication with remote I/O stations, remote device stations, and local stations is described below.
Refer to Section 4.5 for details.



① Turn on the refresh instruction.
② Startup the data link.
③ By the link scan, data in the remote I/O station's and remote device station's remote input (RX) and local station's remote output (RY) is sent to the master station's remote input (RX) and local station's remote output (RY).
④ By the link scan, data in the master station's remote output (RY) is sent to the remote I/O station's and remote device station's remote output (RY) and local station's remote input (RX).
⑤ By the link scan, data in the master station's remote register (RWw) is sent to the remote device station's remote register (RWw) and local station's remote register (RWr).
⑥ By the link scan, data in the remote device station's remote register (RWr) and local station's remote register (RWw) is sent to the master station's remote register (RWr) and local station's remote register (RWw).

1.4 Number of Occupied Stations and Station Number, Number of Modules and Number of Stations

The relationship between number of occupied station and station number, and between number of modules and number of stations is described below.

(1) Number of occupied stations

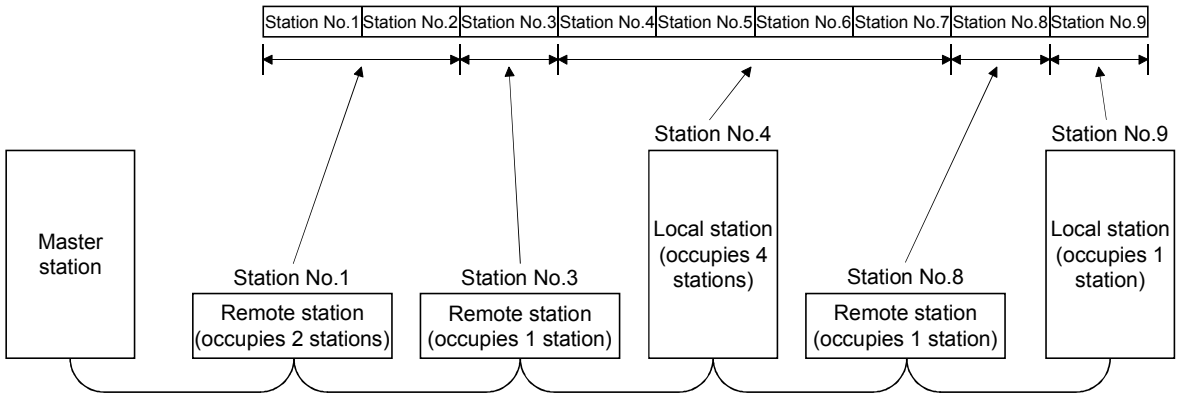
The number of occupied stations is fixed for each module (remote I/O station, remote device station, and local station).
However, the number of occupied stations can be set (1 to 4 stations∗) for local stations.

Module		Number of occupied stations
Remote I/O station (16 points and 32 points module)		1 station
Remote device station	AJ65BT-64AD	2 stations
	AJ65BT-64DAV	2 stations
	AJ65BT-64DAI	2 stations
	AJ65BT-D62 AJ65BT-D62D (S1)	4 stations
	A852GOT	2 or 4 stations
Local station		1 to 4 stations∗ (changed by switch)
Intelligent device station	AJ65BT-R2(N)	1 station
	AJ65BT-G4	1 station
	AJ65BT-D75P2-S3	4 stations

∗ The AJ61QBT11 of hardware version F or later and the A1SJ61QBT11 of hardware version G or later are compatible with this setting. For other than the above, the setting is 1 or 4 stations only.

(2) Station number

When the number of occupied station for all connected stations is set to "1 station," the station number is set continuously from 1 (e.g. 1, 2, 3,...).
However, when a station which occupies more than 2 stations is connected, the setting must be performed considering the number of occupied stations.



(3) Number of modules and number of stations

Number of modules is a physical module count.
Number of stations is a number of occupied stations for each module as stated in (1).
In the system configuration example in (2), the number of modules is 5 and number of stations is 9.

1.5 Generic Terms and Abbreviations

Generic terms and abbreviations used in this manual are shown below.

Generic Term/Abbreviation	Description
AJ61QBT11	Abbreviation for the AJ61QBT11 CC-Link System Master/Local Module.
A1SJ61QBT11	Abbreviation for the A1SJ61QBT11 CC-Link System Master/Local Module.
Master station	Station that controls the data link system. One master station is required for each system.
Local station	Station having a programmable controller CPU and the ability to communicate with the master and other local stations.
Remote I/O station	Remote station that handles bit unit data only. (Performs input and output with external devices.) (AJ65BTB1-16D, AJ65SBTB1-16D)
Remote device station	Remote station that handles bit unit and word unit data only. (Performs input and output with external devices, and analog data conversion.) (AJ65BT-64AD, AJ65BT-64DAV, AJ65BT-64DAI)
Remote station	Generic term for remote I/O station and remote device station. (Controlled by a master station)
Intelligent device station	Station that can perform transient transmission, such as the AJ65BT-R2(N) (Including local station).
Standby master station	Backup station for data link control when the link to the master station is disconnected due to a programmable controller CPU or power supply problem.
Slave station	Generic term for the remote I/O station, remote device station, local station, intelligent device station and standby master station.
Master/local module	Generic term for the AJ61QBT11, and A1SJ61QBT11.
Master module	Generic term for the AJ61QBT11, and A1SJ61QBT11 when they are used as master station.
Local module	Generic term for the AJ61QBT11, and A1SJ61QBT11 when they are used as local station.
Remote module	Generic term for the AJ65BTB1-16D, AJ65SBTB1-16D, AJ65BT-64AD, AJ65BT-64DAV, AJ65BT-64DAI, and A852GOT.
AJ65BT-R2(N)	Generic term for AJ65BT-R2 and AJ65BT-R2N.
Intelligent device module	Module that can perform transient transmission, such as AJ65BT-R2(N) (including local module).
Remote I/O net mode	Dedicated mode for sending and receiving data to and from the remote I/O station at high speed.
Remote net mode	Mode that can communicate with all stations used for CC-Link (remote I/O station, remote device station, local station, intelligent device station, and standby master station)
Cycric transmission	Transmission method by which to periodically communicate the contents of remote I/O, and remote registers.
Transient transmission	Transmission method with which the counterpart is specified and 1:1 communication is used at an arbitrary timing.
AnSCPU	Generic term for the A1SCPU, A1SCPU-S1, A1SJCPU, A1SJCPU-S3, A2SCPU, A2SCPU-S1, and A1SCPUC24-R2.
AnCPU	Generic term for the A1CPU, A2CPU, A2CPUS1, and A3CPU.
AnNCPU	Generic term for the A1NCPU, A2NCPU, A2NCPUS1, and A3NCPU.
AnACPU	Generic term for the A2ACPU, A2ACPUS1, and A3ACPU.
A2USCPU	Generic term for the A2USCPU and A2USCPUS1.
AnUCPU	Generic term for the A2UCPU, A2UCPUS1, A3UPU, and A4UCPU.
Q2ASCPU	Generic term for the Q2ASCPU, Q2ASCPUS1, Q2ASHCPU, and Q2ASHCPUS1.
QnACPU	Generic term for the Q2ACPU, Q2ACPUS1, Q3ACPU, and Q4ACPU.
SB	Link special relay (for CC-Link) Bit unit information that indicates the module operating status and data link status of the master station/local station.
SW	Link special register (for CC-Link) 16-bit unit information that indicates the module operating status and data link status of the master station/local station.
RX	Remote input (for CC-Link) Information entered in bit units from the slave stations to the master station.
RY	Remote output (for CC-Link) Information output in bit units from the master station to the slave station

Generic Term/Abbreviation	Description
RWw	Remote register (Write area for CC-Link) Information output in 16-bit units from the master station to the slave station.
RWr	Remote register (Read area for CC-Link) Information entered in 16-bit units from the slave station to the master station.

2. SYSTEM CONFIGURATION

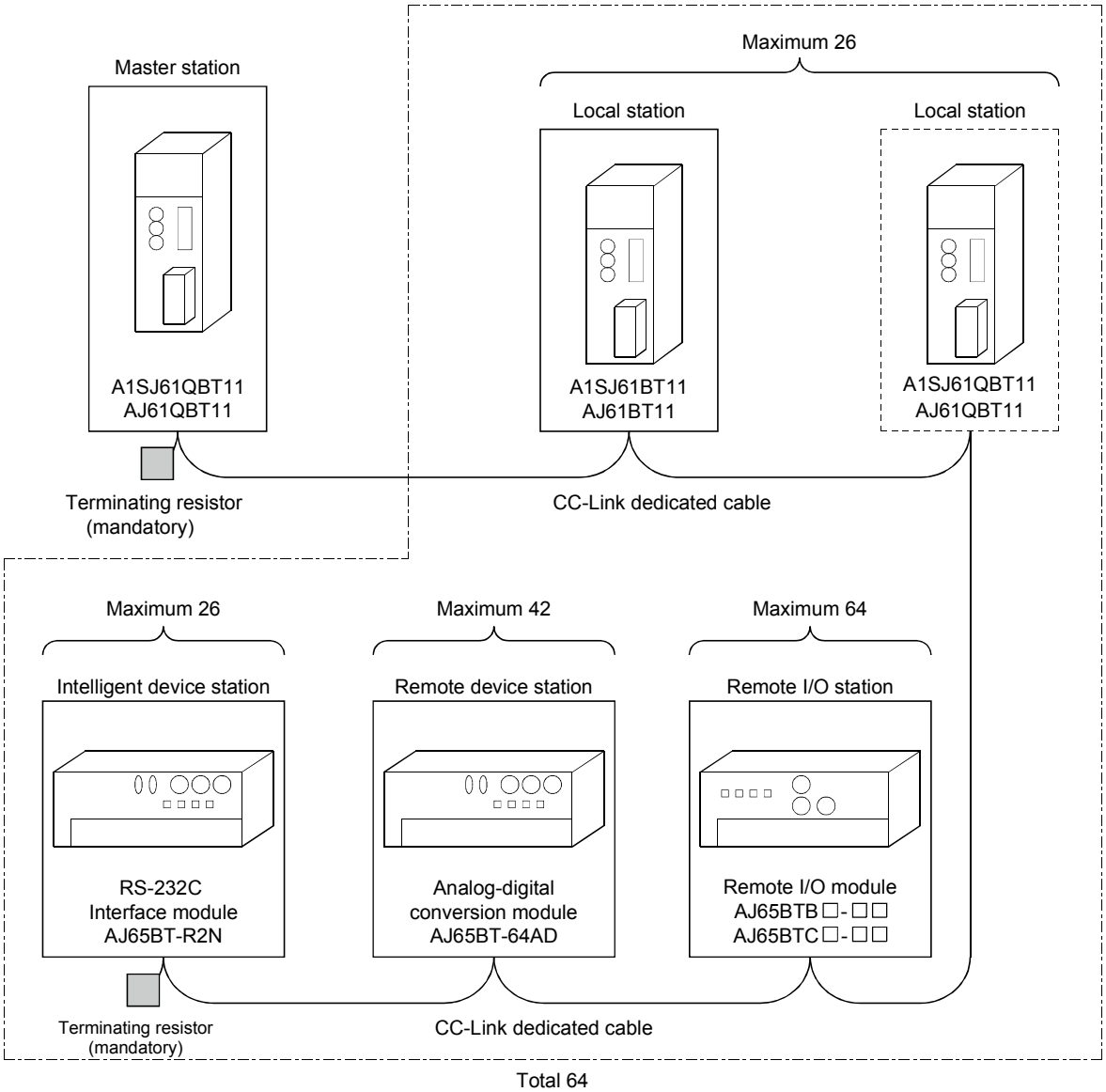
The system configuration for the CC-Link is described in this chapter.

2.1 Total Configuration

A total of 64 remote I/O stations, remote device stations, or local stations can be connected for one master station.
However, the following conditions must be satisfied:

(1) {(1×a)+(2×b)+(3×c)+(4×d)} ≤ 64
a : Number of modules occupying 1 station c : Number of modules occupying 3 stations
b : Number of modules occupying 2 stations d : Number of modules occupying 4 stations

(2) {(16×A)+(54×B)+(88×C)} ≤ 2304
A : Number of remote I/O stations ≤ 64
B : Number of remote device stations ≤ 42
C : Number of local stations, standby master stations, intelligent device stations ≤ 26



2.2 Applicable System

The applicable CPU modules and the precautions for system configuration are described below.

2.2.1 Applicable CPU and number of modules that can be installed

The applicable programmable controller CPU, data link system/network system, and the number of modules that can be installed are shown in Table 2.1.
However, intelligent mode cannot be used for future plan.

Table 2.1 Number of modules that can be installed

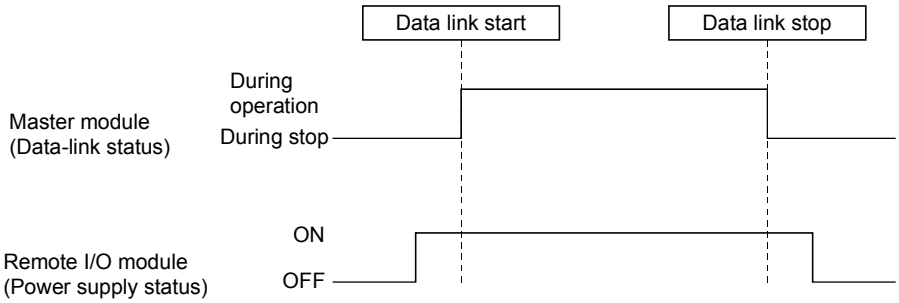
<table>
<tr><th colspan="3">Installation area</th><th>A1SJ61QBT11</th><th>AJ61QBT11</th></tr>
<tr><td rowspan="30">Programmable controller CPU</td><td colspan="2">A0J2CPU</td><td rowspan="12">Unusable</td><td rowspan="12">Unusable</td></tr>
<tr><td colspan="2">A0J2HCPU</td></tr>
<tr><td colspan="2">A1SCPU (S1)</td></tr>
<tr><td colspan="2">A1SHCPU</td></tr>
<tr><td colspan="2">A1SJCPU (S3)</td></tr>
<tr><td colspan="2">A1SJHCPU (S8)</td></tr>
<tr><td colspan="2">A1SCPUC24-R2</td></tr>
<tr><td colspan="2">A2SCPU (S1)</td></tr>
<tr><td colspan="2">A2SHCPU (S1)</td></tr>
<tr><td colspan="2">A2ASCPU (S1/S30)</td></tr>
<tr><td colspan="2">A2USHCPU-S1</td></tr>
<tr><td colspan="2">Q2ASCPU (S1)</td><td rowspan="2">No restrictions</td><td rowspan="2">No restrictions</td></tr>
<tr><td colspan="2">Q2ASHCPU (S1)</td></tr>
<tr><td colspan="2">A1CPU</td><td rowspan="16">Unusable</td><td rowspan="12">Unusable</td></tr>
<tr><td colspan="2">A2CPU (S1)</td></tr>
<tr><td colspan="2">A3CPU</td></tr>
<tr><td colspan="2">A1NCPU</td></tr>
<tr><td colspan="2">A2NCPU (S1)</td></tr>
<tr><td colspan="2">A3NCPU</td></tr>
<tr><td colspan="2">A3MCPU</td></tr>
<tr><td colspan="2">A3HCPU</td></tr>
<tr><td colspan="2">A2ACPU (S1)</td></tr>
<tr><td colspan="2">A3ACPU</td></tr>
<tr><td colspan="2">A2UCPU (S1)</td></tr>
<tr><td colspan="2">A3UCPU</td></tr>
<tr><td colspan="2">A4UCPU</td></tr>
<tr><td colspan="2">Q2ACPU (S1)</td><td rowspan="4">No restrictions</td></tr>
<tr><td colspan="2">Q3ACPU</td></tr>
<tr><td colspan="2">Q4ACPU</td></tr>
<tr><td colspan="2">Q4ARCPU</td></tr>
<tr><td rowspan="5">Data link and network</td><td colspan="2">MELSECNET remote I/O station</td><td>Unusable</td><td>Unusable</td></tr>
<tr><td colspan="2">MELSECNET/B remote I/O station</td><td>Unusable</td><td>Unusable</td></tr>
<tr><td rowspan="3">MELSECNET/10 remote I/O station</td><td>AJ72LP25
AJ72LP15</td><td>Unusable</td><td>Unusable</td></tr>
<tr><td>AJ72QLP25
AJ72QBR15</td><td>Unusable</td><td>No restrictions</td></tr>
<tr><td>A1SJ72QLP25
A1SJ72QBR15</td><td>No restrictions</td><td>No restrictions</td></tr>
</table>

2.2.2 Precautions when configuring a system

Design the system with the following considerations to prevent mis-input from the remote I/O module:

(1) During power on and power off

Start the data link after turning on the power for the remote I/O module.
Turn off power for the remote I/O module after stopping the data link.

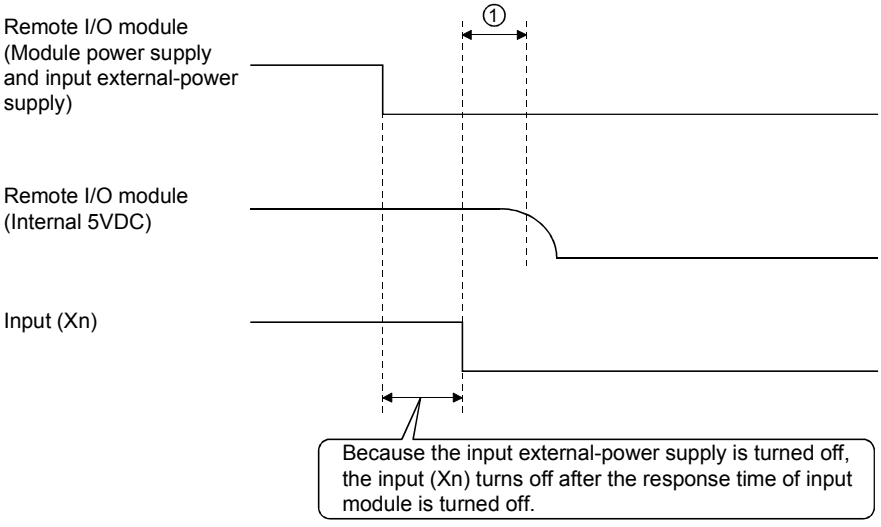


(2) During momentary power failure of the remote I/O module

When momentary power failure occurs with the power (24VDC) supplied to the remote I/O module, mis-input may occur.

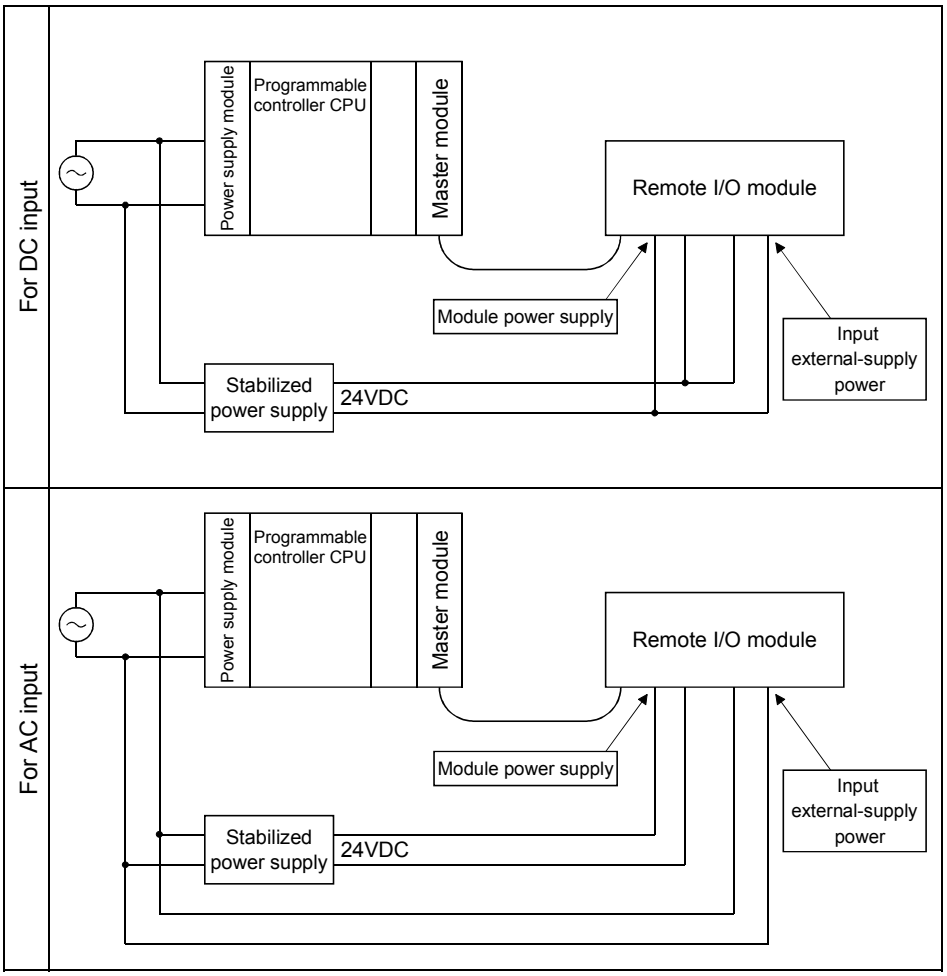
(a) Cause for mis-input due to a momentary power failure

The remote I/O module hardware uses the power after internally converting the module power (24VDC) in to 5VDC.
When momentary power failure occurs with the remote I/O module, the following condition occurs:
(Time for the 5VDC in the internal remote I/O module to turn off) > (input module on → off response time)
Therefore, mis-input is caused when a refresh is performed within the time indicated by ①) in the diagram below.



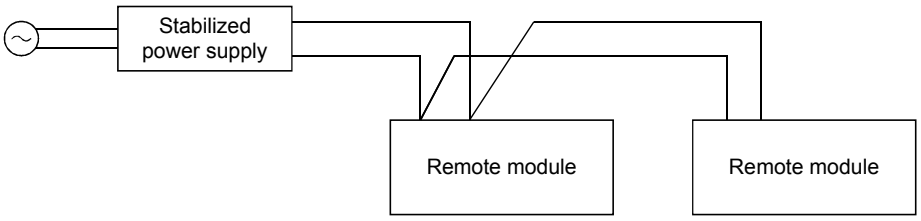
(b) Countermeasure for mis-input

Wire the power supply cable for the power supply module, stabilized power, and input/external-supply power of the AC input from the same power source.



REMARK

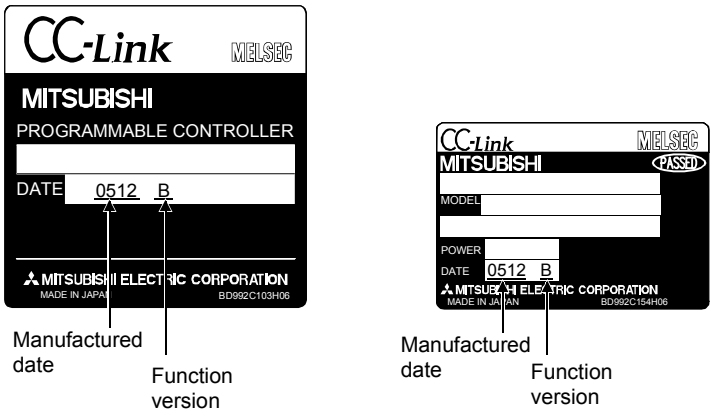
When supplying power from one power source to multiple remote I/O modules, select the cable and perform the wiring with considerations to the voltage decline from the cables.
Connections can be established if the remote I/O module's receiving port voltage is within the specification range of the used remote I/O module.



POINT

To utilize the functions described in Chapter 14 or later, use a module with "9707B*" or later is shown as a DATE code on the rating plate.

* "9707B" indicates that the module was manufactured in July 1997 and its function version is B.



(3) Access to station No.64

(a) To a local station of No. 64, other station access from GX Developer or GOT is not allowed.
If the station No. is changed to other than 64, other station access is executable.

(b) The CC-Link board is not allowed to access a local station or intelligent device station whose station No. is 64.
If the station No. is changed to other than 64, other station access is executable.

(4) Precautions for use on remote I/O stations

Transient transmissions using dedicated instructions are not allowed to local stations and intelligent device stations.

2.2.3 List of system equipment restricted by master/local module versions

Table 2.2 lists the CC-Link system equipment restricted by the function, hardware and software versions of the master/local modules.

Table 2.2 System equipment list

Product name	Model	Description	Number of occupied stations	Station type
Master/local module	A1SJ61BT11	Master/local module for AnS/A2US series	When local station→1 to 4 stations ＊1	Master or local station
	AJ61BT11	Master/local module for A series		
	A1SJ61QBT11	Master/local module for Q2AS series		
	AJ61QBT11	Master/local module for QnA series		
	QJ61BT11	Master/local module for Q series		
High-speed counter module	AJ65BT-D62＊2	24 bit binary, 5/12/24VDC input type, 200kPPS, 2 channels	4 stations	Remote device staion
	AJ65BT-D62D(S1) ＊2	24 bit binary, differential input type, 400kPPS, 2 channels		
Thermocouple temperature input module	AJ65BT-68TD＊2	For connecting thermocouple Temperature input 8 channels		
Platinum temperature measuring resistor Pt100 temperature input module	AJ65BT-64RD3＊2	For connecting Pt 100 (3 wire type) Temperature input 4 channels		
	AJ65BT-64RD4＊2	For connecting Pt 100 (4 wire type) Temperature input 4 channels		
ID interface module	AJ65BT-D32ID2＊2	Number of readers/writers that can be connected is 2		
RS-232C interface module	AJ65BT-R2(N)＊2	Computer link function RS-232C, 1 channel	1 station	Intelligent device station
Positioning module	AJ65BT-D75P2-S3 ＊2	For positioning control, Pulse chain output 2 axes (independent, simultaneous 2 axial, 2 axial linear interpolation and 2 axial circular interpolation)	4 stations	
Peripheral device connection module	AJ65BT-G4-S3＊3	For peripheral device connection RS-422, 1 channel	1 station	

＊1 Supported by the hardware version F and later of the AJ61BT11 and AJ61QBT11, the hardware version G and later of the A1SJ61BT11 and A1SJ61QBT11, and the function version B and later of the QJ61BT11.
For other than the above, the setting is one station or four stations only.

＊2: Can be used with function version B or later.

＊3: Can be used with software version J (manufactured in Jan., 1998) or later.

For a list of products by partner manufacturers, refer to the following CC-Link Partner Association website.
http://www.cc-link.org/

2.2.4 About Ver. 1.10

The module of which the station to station cable length is uniformly 20cm or more by improving the conventional limit of the station to station cable length is defined as Ver. 1.10.
The conventional modules are defined as Ver. 1.00.
Refer to Section 3.2.2 for the maximum overall cable distance of Ver. 1.10.
The conditions for setting the station to station cable length uniformly to 20cm or more are indicated below.

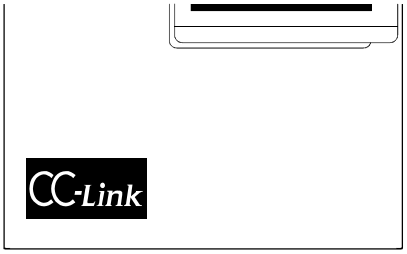
1) All modules configuring the CC-Link system must use Version 1.10.
2) All data link cables trust be Version 1.10 compatible CC-Link dedicated cable.

POINT
In a system where the modules of Ver. 1.00 and Ver. 1.10 are used together, the maximum overall cable distance and station to station cable length are as specified for Ver. 1.00. Refer to Section 3.2.1 for the maximum overall cable distance and station to station cable length of Ver. 1.00.

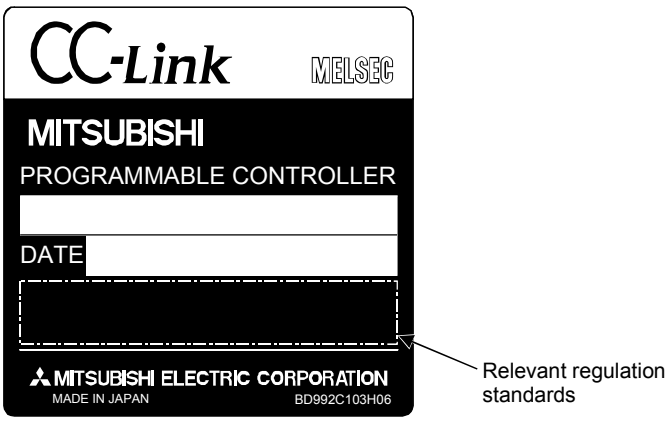
(1) Checking Version 1.10

The "CC-Link" logo is printed on the front of the module or on the "rating plate" for the Version 1.10 modules.

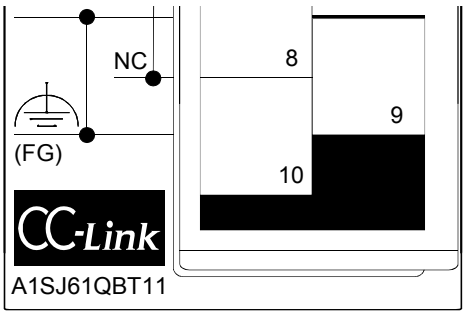
(a) Front of the AJ61QBT11



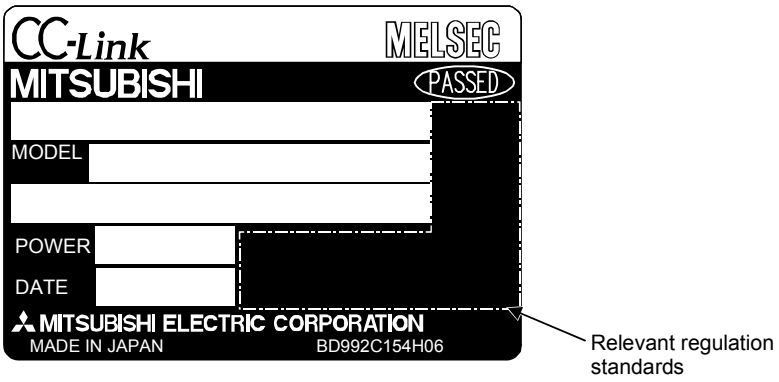
(b) Rating plate of AJ61QBT11



(c) Front of the A1SJ61QBT11



(d) Rating plate of A1SJ61QBT11



3. SPECIFICATION

3.1 General Specification

For general specifications, refer to the user's manual for the CPU module used.

3.2 Performance Specifications

The performance specifications of the CC-Link is shown in Table 3.2.

Table 3.2 Performance specifications

Item	AJ61QBT11	A1SJ61QBT11
Transmission speed	Can select from 156 kbps/ 625 kbps/ 2.5 Mbps/ 5 Mbps/ 10 Mbps	
Maximum overall cable distance (Maximum transmission distance)	Different from the transmission speed: (Refer to Section 3.2.1, 3.2.2)	
Maximum number of connected modules (when master station)	64 modules However, the following conditions must be satisfied: {(1×a) + (2×b) + (3×c) + (4×d)} ≤ 64 a: number of modules occupying 1 station b: number of modules occupying 2 stations c: number of modules occupying 3 stations d: number of modules occupying 4 stations {(16×A) + (54×B) + (88×C)} ≤ 2304 A: Number of remote I/O stations ≤ 64 B: Number of remote device stations ≤ 42 C: Number of local stations, standby master stations, intelligent device stations ≤ 26	
Number of occupied stations (when local station)	1 to 4 stations ∗1 (switched using DIP switch)	
Maximum link points for one system	Remote I/O (RX, RY) : 2048 points Remote register (RWw) : 256 points (master station → remote/local station) Remote register (RWr) : 256 points (remote/local station → master station)	
Link points for one remote/local station	Remote I/O (RX, RY) : 32 points (local station: 30 points) Remote register (RWw) : 4 points (master station → remote/local station) Remote register (RWr) : 4 points (remote/local station → master station)	
Communication method	Broadcast polling method	
Synchronous method	Frame synchronous method	
Encoding method	NRZI method	
Transmission path	Bus (RS-485)	
Transmission format	HDLC standard	
Error control system	CRC ($X^{16} + X^{12} + X^5 + 1$)	
Connection cable ∗2	CC-Link dedicated cable (Ver.1.00)/CC-Link dedicated high performance cable/Version 1.10 compatible CC-Link dedicated cable	
RAS function	• Automatic return function • Slave station cutoff function • Error detection by the link special relay/register	
Number of parameter registration to E^2PROM	10,000 times	
I/O occupied points	32 points (I/O allocation: 32 special points)	
Internal current consumption (5VDC)	0.45 A	0.4 A
Weight	0.4 kg	0.25 kg

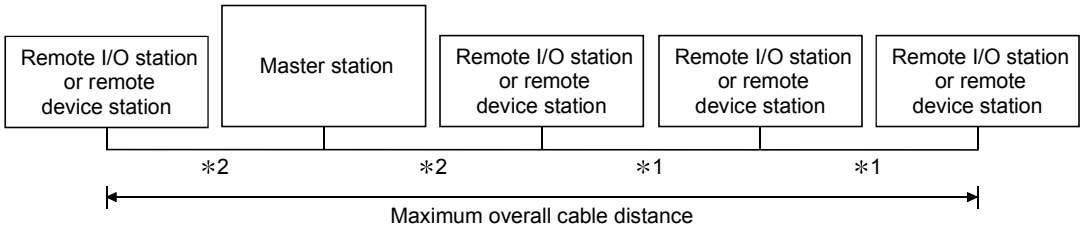
∗1: The AJ61QBT11 of hardware version F or later and the A1SJ61QBT11 of hardware version G or later are compatible with this setting. For other than the above, the setting is 1 or 4 stations only.

∗2: Each of Ver.1.10 compatible CC-Link cables, CC-Link dedicated cables (Ver.1.00), and CC-Link dedicated high performance cables must not be used together with other cable types.
If different cable types are used together, normal data transmission is not guaranteed.
Also attach the terminating resistor which matches the kind of the cable. (Refer to section 7.5)

3.2.1 Maximum overall cable distance (for Ver. 1.00)

The relationship between the transmission speed and the maximum overall cable distance is described below:

(1) For a system consisting of only remote I/O stations and remote device stations



∗1 Cable length between remote I/O stations or remote device stations.
∗2 Cable length between the master station and the adjacent stations.

CC-Link dedicated cable (terminating resistor 110 Ω)

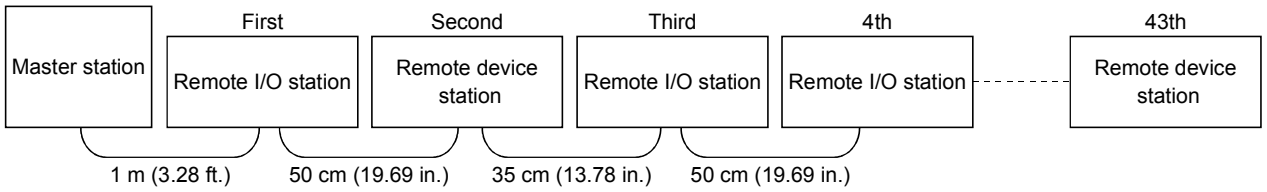
Transmission rate	Station-to-station cable length		Maximum overall cable distance
	∗1	∗2	
156 kbps	30 cm (11.81 in.) or more	1 m (3.28 ft.) or more	1200 m (3937.2 ft.)
625 kbps			600 m (1968.6 ft.)
2.5 Mbps			200 m (656.2 ft.)
5 Mbps	30 cm (11.81 in.) to 59 cm (23.23 in.) ∗		110 m (360.9 ft.)
	60 cm (23.62 in.) or more		150 m (492.15 ft.)
10 Mbps	30 cm (11.81 in.) to 59 cm (23.23 in.) ∗		50 m (164.1 ft.)
	60 cm (23.62 in.) to 99 cm (38.98 in.) ∗		80 m (262.5 ft.)
	1 m (3.28 ft.) or more		100 m (328.1 ft.)

CC-Link dedicated high performance cable (terminating resistor 130 Ω)

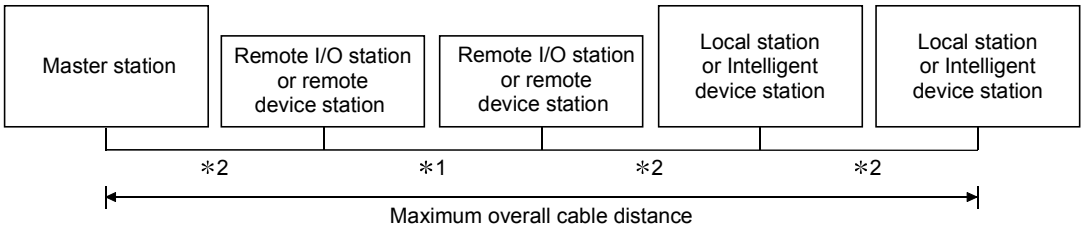
Transmission rate		Station-to-station cable length		Maximum overall cable distance
		∗1	∗2	
156 kbps		30 cm (11.81 in.) or more	1 m (3.28 ft.) or more	1200 m (3937.2 ft.)
625 kbps				900 m (2952.9 ft.)
2.5 Mbps				400 m (1312.4 ft.)
5 Mbps				160 m (524.96 ft.)
10 Mbps	Number of connected stations: 1 to 32			100 m (328.1 ft.)
	Number of connected stations: 33 to 48	30 cm (11.81 in.) to 39 cm (15.35 in.) ∗		80 m (262.5 ft.)
		40 cm (15.75 in.) or more		100 m (328.1 ft.)
	Number of connected stations: 49 to 64	30 cm (11.81 in.) to 39 cm (15.35 in.) ∗		20 m (65.52 ft.)
		40 cm (15.75 in.) to 69 cm (27.17 in.) ∗		30 m (98.43 ft.)
		70 cm (27.56 in.) or more		100 m (328.1 ft.)

∗ The cable length between remote I/O stations or remote device stations is within this range and if even one location is wired, the maximum overall cable distance will be as indicated above.

(Example) When the transmission rate is 10 Mbps, and 43 remote I/O stations and remote device stations are connected using the CC-Link dedicated high performance cable, because the cable connecting the second and third stations is "35 cm (13.78 in.)", the maximum overall cable distance will be "80 cm (31.5 in.)".



(2) For a system consisting of remote I/O stations, remote device stations, local stations and intelligent device stations



∗1 Cable length between remote I/O stations or remote device stations

∗2 Cable length between the master, local or, intelligent device station and the adjacent stations

CC-Link dedicated cable (terminating resistor 110 Ω)

Transmission rate	Station-to-station cable length		Maximum overall cable distance
	∗1	∗2	
156 kbps	30 cm (11.81 in.) or more	2 m (6.56 ft.) or more	1200 m (3937.2 ft.)
625 kbps			600 m (1968.6 ft.)
2.5 Mbps			200 m (656.2 ft.)
5 Mbps	30 cm (11.81 in.) to 59 cm (23.23 in.) ∗		110 m (360.9 ft.)
10 Mbps	60 cm (23.62 in.) or more		150 m (492.15 ft.)
	30 cm (11.81 in.) to 59 cm (23.23 in.) ∗		50 m (164.1 ft.)
	60 cm (23.62 in.) to 99 cm (38.98 in.) ∗		80 m (262.5 ft.)
	1 m (3.28 ft.) or more		100 m (328.1 ft.)

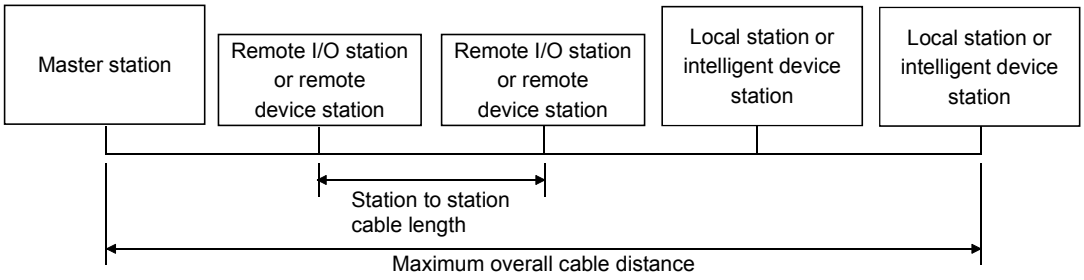
CC-Link dedicated high performance cable (terminating resistor 130 Ω)

Transmission rate	Station-to-station cable length		Maximum overall cable distance
	∗1	∗2	
156 kbps	30 cm (11.81 in.) or more	2 m (6.56 ft.) or more	1200 m (3937.2 ft.)
625 kbps			600 m (1968.6 ft.)
2.5 Mbps			200 m (656.2 ft.)
5 Mbps	30 cm (11.81 in.) to 59 cm (23.23 in.) ∗		110 m (360.9 ft.)
	60 cm (23.62 in.) or more		150 m (492.15 ft.)
10 Mbps	70 cm (27.56 in.) to 99 cm (38.98 in.) ∗		50 m (164.1 ft.)
	1 m (3.28 ft.) or more		80 m (262.5 ft.)

∗ The cable length between remote I/O stations or remote device stations is within this range and if even one location is wired, the maximum overall cable distance will be as indicated above.

3.2.2 Maximum overall cable distance (for Ver. 1.10)

The relation of the transmission speed and maximum overall cable distance when configuring the entire system with Version 1.10 modules and cable is shown below.



Version 1.10 compatible CC-Link dedicated cable (terminating resistor 110Ω)

Transmission speed	Station to station cable length	Maximum overall cable distance
156kbps	20cm or longer	1200m
625kbps		900m
2.5Mbps		400m
5Mbps		160m
10Mbps		100m

3.3 CC-Link Dedicated Cable

Use the CC-Link dedicated cables for the CC-Link system. If a cable other than the CC-Link dedicated cable is used, the performance of the CC-Link system cannot be guaranteed.
For the specifications of the CC-Link dedicated cables or any other inquiries, visit the following website:
CC-Link Partner Association: http://www.cc-link.org/

REMARK

For details, refer to the CC-Link cable wiring manual issued by CC-Link Partner Association.

3.4 I/O Signals to the Programmable Controller CPU

The I/O signals for the master/local module's programmable controller CPU is described.

3.4.1 I/O signal list

The list of I/O signals is described in Table 3.3.
The "n" in the table indicates the master/local module's first I/O number, and it is determined by the installation position and the module installed before the master/local module.
<Example> When the master/local module's first I/O number is "X/Y30":
Xn0 to X(n+1)F → X30 to X4F
Yn0 to Y(n+1)F → Y30 to Y4F

Table 3.3 I/O signal list

Signal direction: programmable controller CPU ← master/local module				Signal direction: programmable controller CPU → master/local module			
Input number	Signal name	Availability		Output number	Signal name	Availability	
		Master station	Local station			Master station	Local station
Xn0	Module error	○	○	Yn0	Refresh instruction	○	○
Xn1	Data link status at host station	○	○	Yn1	(Prohibited to use)	–	–
Xn2	Parameter setting status	○	×	Yn2			
Xn3	Data link status at other stations	○	○	Yn3			
Xn4	Module reset acceptance complete	○	○	Yn4	Module reset request	○	○
Xn5	(Prohibited to use)	–	–	Yn5	(Prohibited to use)	–	–
Xn6	Data link startup by buffer memory parameter normal completion	○	×	Yn6	Data link startup request from buffer memory parameters	○	×
Xn7	Data link startup by buffer memory parameter error completion	○	×	Yn7	(Prohibited to use)	–	–
Xn8	Data link startup by E^2PROM parameter normal completion	○	×	Yn8	Data link startup request from the E^2PROM parameters	○	×
Xn9	Data link startup by E^2PROM parameter error completion	○	×	Yn9	(Prohibited to use)	–	–
XnA	Parameter registration to E^2PROM normal completion	○	×	YnA	Parameter registration request to E^2PROM	○	×
XnB	Parameter registration to E^2PROM error completion	○	×	YnB	(Prohibited to use)	–	–
XnC	(Prohibited to use)	–	–	YnC			
XnD	E^2PROM erasure normal completion	○	×	YnD	E^2PROM erasure request	○	×
XnE	E^2PROM erasure abnormal completion	○	×	YnE	(Prohibited to use)	–	–
XnF	Module ready	○	○	YnF			

○: Usable ×: Prohibited to use

Table 3.3 I/O signal list

Signal direction: programmable controller CPU ← master/local module				Signal direction: programmable controller CPU → master/local module			
Input number	Signal name	Availability		Output number	Signal name	Availability	
		Master station	Local station			Master station	Local station
X(n+1)0	(Prohibited to use)	–	–	Y(n+1)0	(Prohibited to use)	–	–
X(n+1)1				Y(n+1)1			
X(n+1)2				Y(n+1)2			
X(n+1)3				Y(n+1)3			
X(n+1)4				Y(n+1)4			
X(n+1)5				Y(n+1)5			
X(n+1)6				Y(n+1)6			
X(n+1)7				Y(n+1)7			
X(n+1)8				Y(n+1)8			
X(n+1)9				Y(n+1)9			
X(n+1)A				Y(n+1)A			
X(n+1)B				Y(n+1)B			
X(n+1)C				Y(n+1)C			
X(n+1)D				Y(n+1)D			
X(n+1)E				Y(n+1)E			
X(n+1)F				Y(n+1)F			

○: Usable ×: Prohibited to use

Important

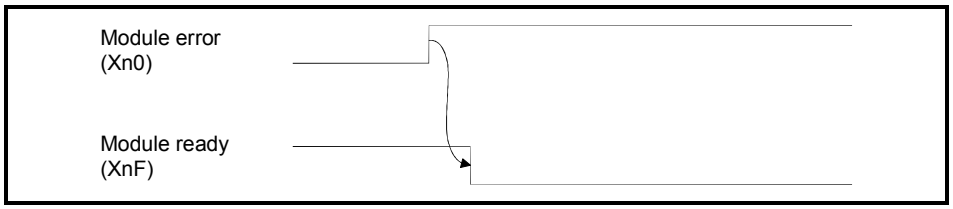
The output signals that are prohibited to use as shown in Table 3.3 are used by the system, so users may not use them. When a user does use (on/off) these signals, a normal operation cannot be guaranteed.

3.4.2 I/O signal details

The on/off timing, conditions, etc. of I/O signals shown in Table 3.3 are described.

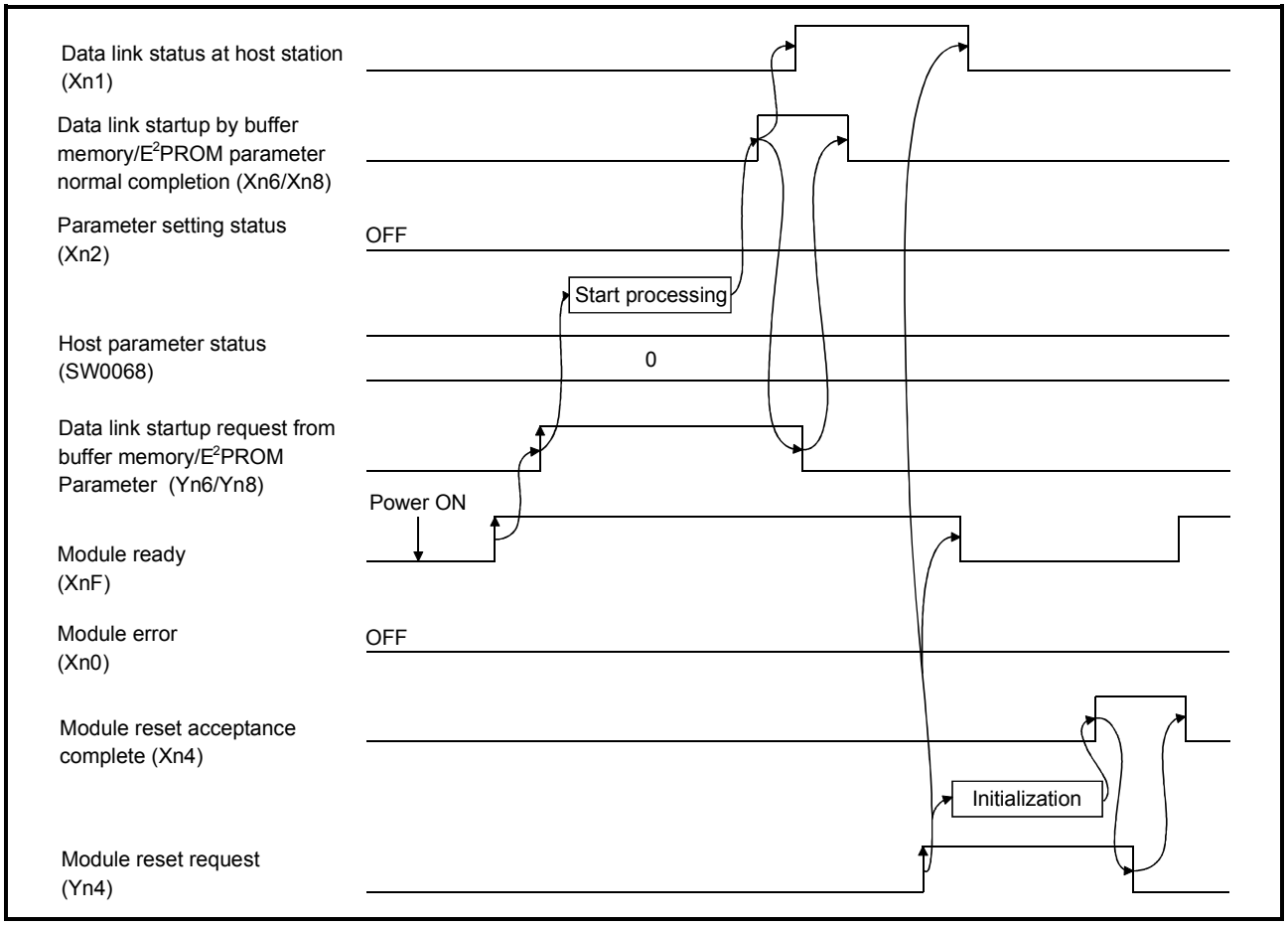
(1) Module error: Xn0

Indicates if the module is normal or not.
Turns ON when a watchdog timer error occurs due to a hardware fault or the like.
When making a reset, reset the programmable controller CPU.
OFF : module normal
ON : module error



(2) Data link status at host station: Xn1

Indicates data link status at the host station.
SB006E represents the same meaning. For programming, use either Xn1 or SB006E.
Note that the ON/OFF condition for Xn1 is opposite to that for SB006E.
When Xn1 is used, the condition is as follows:
OFF : data link stopped
ON : data link in progress



(3) Parameter setting status: Xn2

Indicates parameter setting status at host station.
SB006D represents the same meaning. For programming, use either Xn2 or SB006D.
OFF : normal
ON : error in setting (An error code is stored in SW0068.)
Turns off when Yn6 or Yn8 is executed in the status that error does not occur.

(4) Data link status at other stations: Xn3

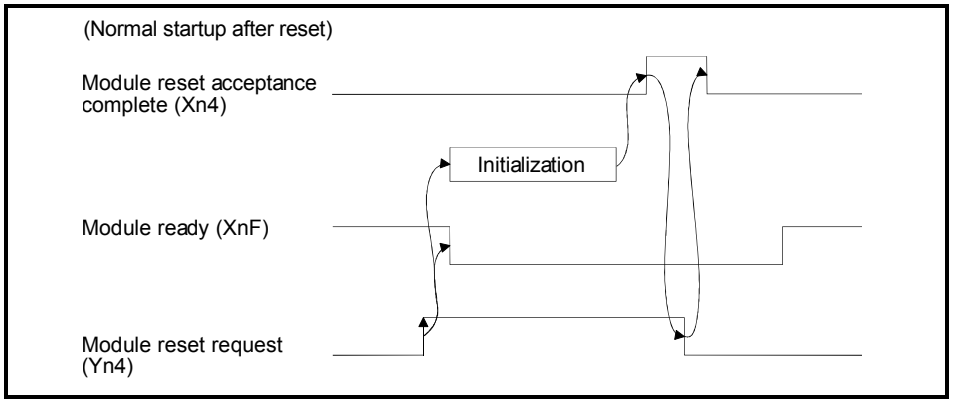
Indicates data link status at other stations (remote/local stations).
SB0080 represents the same meaning. For programming, use either Xn3 or SB0080.

OFF : all stations normal
ON : error station exists (An error station status is stored in SW0080 to 83.)

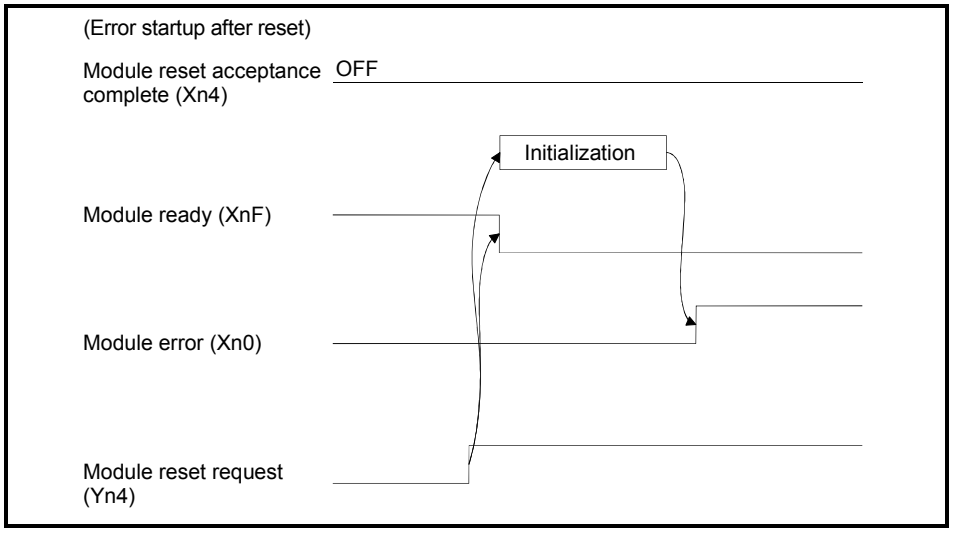
(5) Module reset acceptance complete: Xn4

Indicates the acceptance status of reset request by the module reset request (Yn4).
Reset cannot be performed when module error (Xn0 on).

(a) When module reset request (Yn4) is turned on, module ready (XnF) turns off and initialization is executed.
When the initialization is completed normally, module ready (XnF) turns on.
Module reset request (Yn4) is turned off by turning on the module reset acceptance complete (Xn4).
To make a data link, set the data link startup request (Yn6/Yn8) again.



(b) When module reset request (Yn4) is turned on, module ready (XnF) turns off and initialization is executed.
When the initialization is completed abnormally, module ready (XnF) does not turn on, but module error (Xn0) turns on.



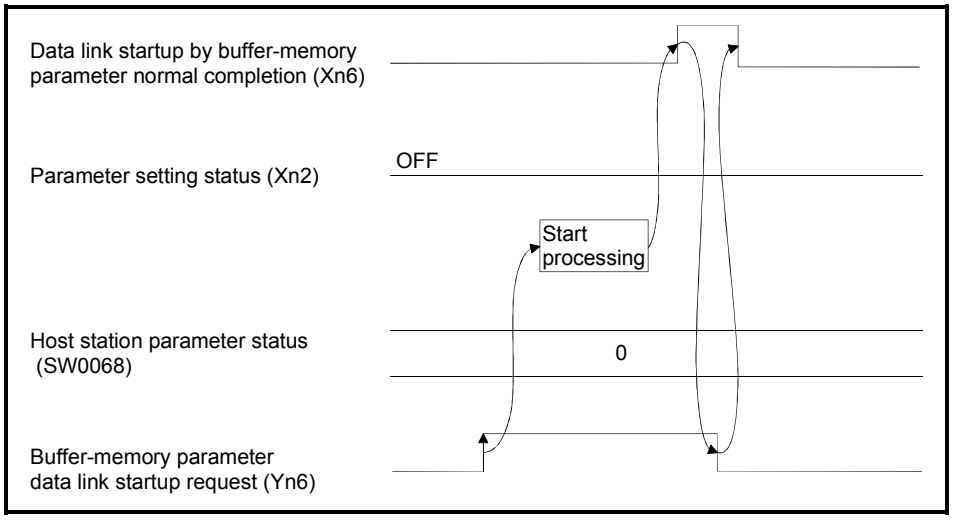
(6) Data link startup by buffer memory parameter normal completion: Xn6

Indicates normal completion in data link startup requested by the buffer-memory parameter data link startup request (Yn6).

(a) When (Yn6) is turned on, the parameter contents at the (address 0H to 5FH) in buffer memory are checked. If the check result is normal data link is started automatically.

(b) When data link is normally started, the signal for "data link startup by buffer-memory parameter normal completion" (Xn6) is turned on.

(c) (Xn6) is turned off by turning off (Yn6).



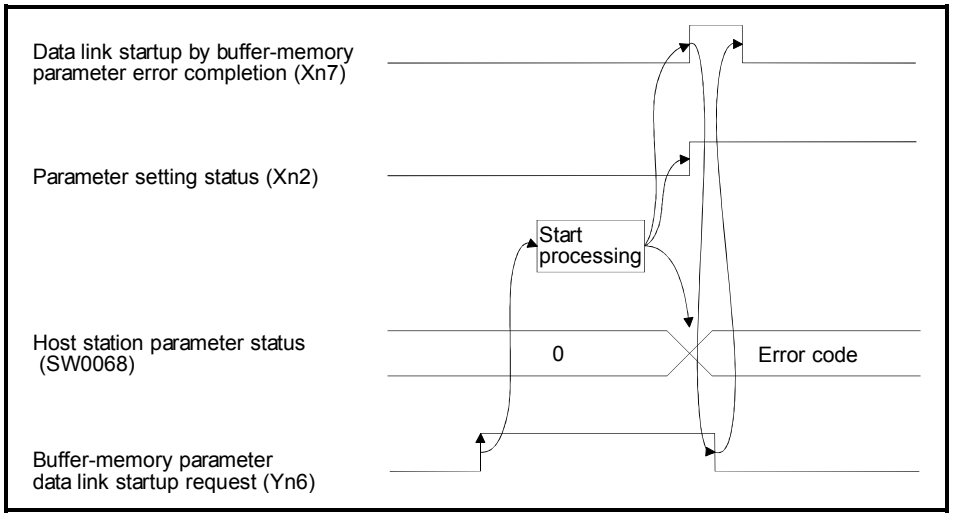
(7) Data link startup by buffer memory parameter error completion: Xn7

Indicates abnormal completion in data link startup requested by the buffer-memory parameter data link startup request (Yn6).

(a) When (Yn6) is turned on, the parameter contents at the (address 0H to 5FH) in buffer memory are checked. If error is detected the signal for "data link startup by buffer-memory parameter abnormal completion" (Xn7) is turned on.

(b) Parameter setting status (Xn2) is turned on and the error code is stored in the host station parameter status in buffer memory (SW0068).

(c) (Xn7) is turned off by turning off (Yn6).



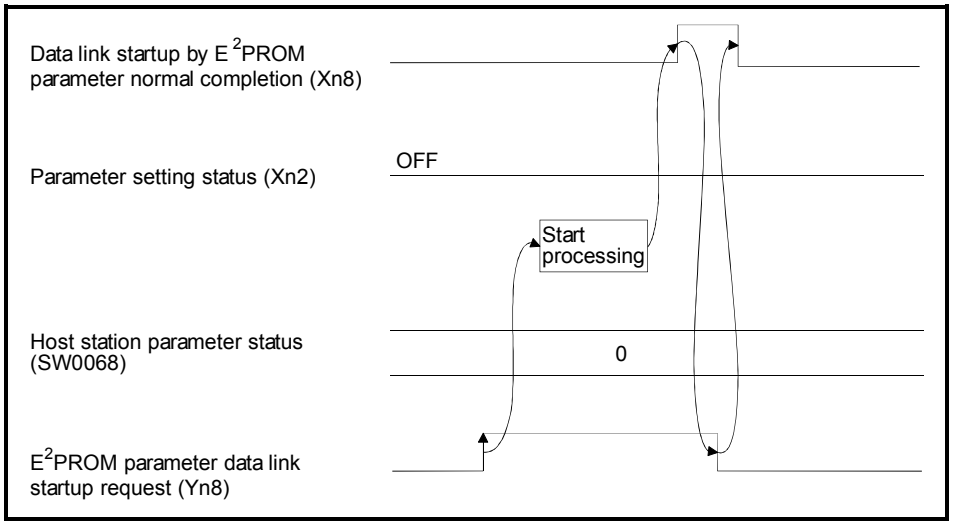
(8) Data link startup by E^2PROM parameter normal completion: Xn8

Indicates normal completion in data link startup requested by the E^2PROM parameter data link startup request (Yn8).

(a) When (Yn8) is turned on, the E^2PROM parameter contents are checked. If the check result is normal data link is started automatically.

(b) When data link is normally started, the signal for "data link startup by E^2PROM parameter normal completion" (Xn8) is turned on.

(c) (Xn8) is turned off by turning off (Yn8).



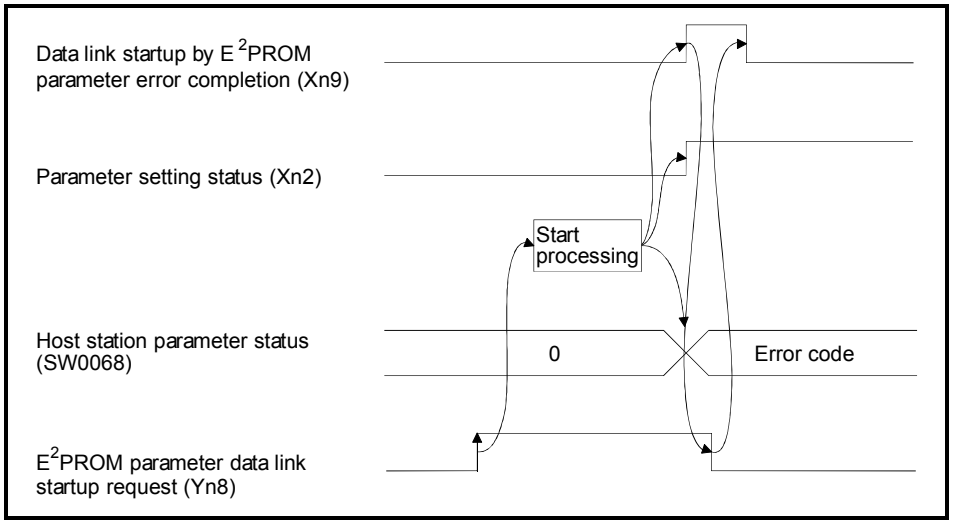
(9) Data link startup by E^2PROM parameter error completion: Xn9

Indicates abnormal completion in data link startup requested by the E^2PROM parameter data link startup request (Yn8).

(a) When (Yn8) is turned on, the E^2PROM parameter contents are checked. If error is detected the signal for "data link startup by E^2PROM parameter abnormal completion" (Xn9) is turned on.

(b) Parameter setting status (Xn2) is turned on and the error code is stored in the host station parameter status in buffer memory (SW0068).

(c) (Xn9) is turned off by turning off (Yn8).



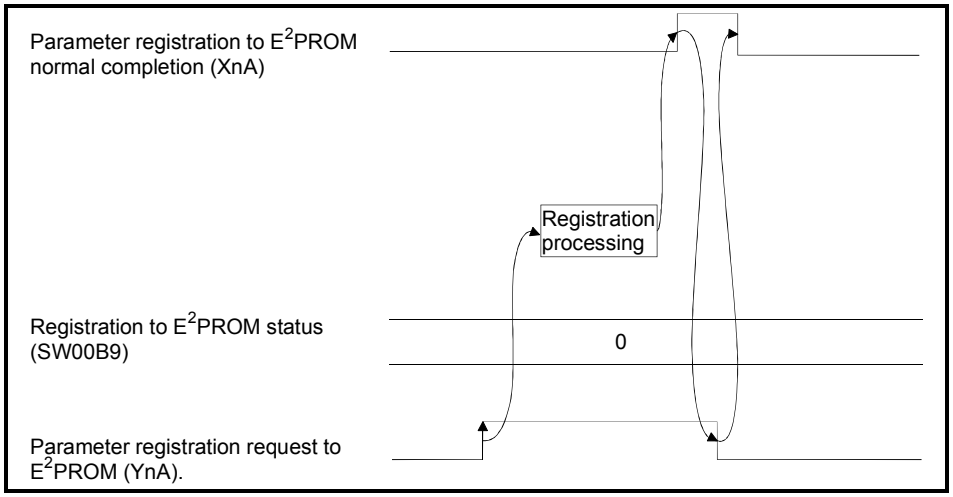
(10) Parameter registration to E^2PROM normal completion: XnA

Indicates normal completion in registering parameters at (buffer-memory address 0H to 5FH) to E^2PROM requested by the parameter registration request to E^2PROM (YnA).

(a) When (YnA) is turned on, the parameter contents stored in the parameter information area buffer memory (address 0H to 5FH) are checked. If the parameters are registered to E^2PROM.

(b) When registration is normally completed, the signal for "parameter registration to E^2PROM normal completion" (XnA) is turned on.

(c) (XnA) is turned off by turning off (YnA).



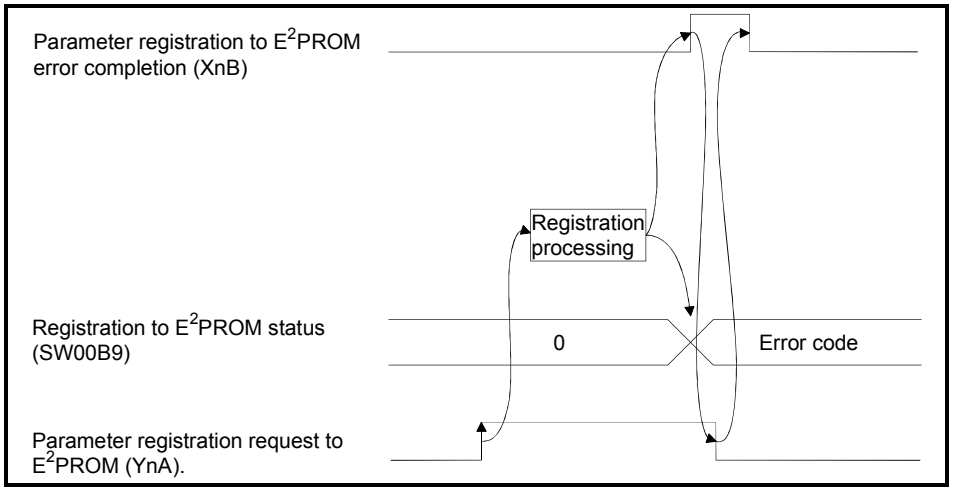
(11) Parameter registration to E^2PROM error completion: XnB

Indicates abnormal completion in registering parameters at (buffer-memory address 0H to 5FH) to E^2PROM requested by the parameter registration request to E^2PROM (YnA).

(a) When the parameter registration request (YnA) to the E^2PROM is turned on, the parameters stored in the buffer-memory "parameter information area (address 0H to 5FH)" are written to the E^2PROM.

(b) When the registration ends error, the E^2PROM parameter registration error (XnB) turns on and the error code is stored in the buffer memory E^2PROM registration status (SW00B9).

(c) (XnB) is turned off by turning off (YnA).



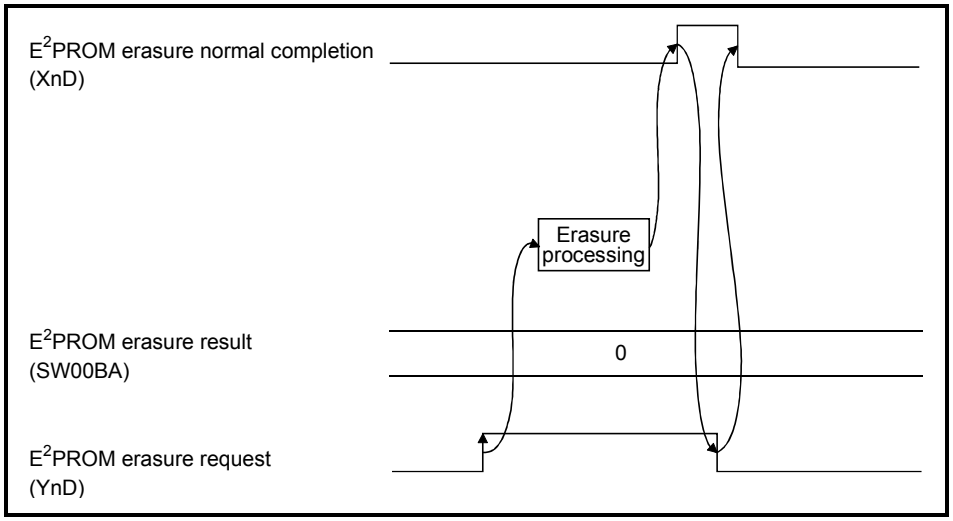
(12) E^2PROM erasure normal completion: XnD

This signal indicates the normal completion of erasing the parameters in the E^2PROM in response to the E^2PROM erasure request (YnD).

(a) When the E^2PROM erasure request (YnD) turns on, the parameters in the E^2PROM are erased.

(b) On normal completion of erasure, the E^2PROM erasure normal completion (XnD) turns on.

(c) By turning off the E^2PROM erasure request (YnD), the E^2PROM erasure normal completion (XnD) turns off.



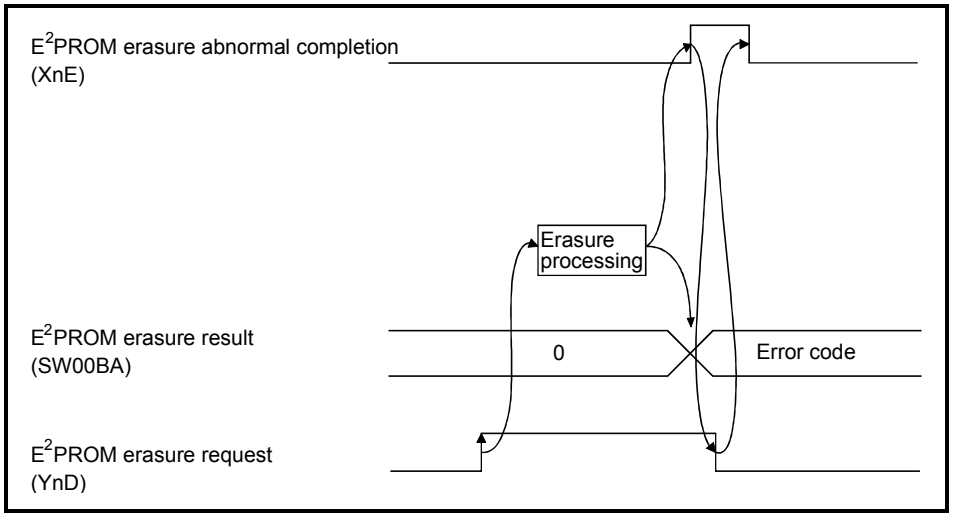
(13) E^2PROM erasure abnormal completion: XnE

This signal indicates the abnormal completion of erasing the parameters in the E^2PROM in response to the E^2PROM erasure request (YnD).

(a) When the E^2PROM erasure request (YnD) turns on, the parameters in the E^2PROM are erased.

(b) On abnormal completion of erasure, the E^2PROM erasure abnormal completion (XnE) turns on and the error code is stored into the E^2PROM erasure result (SW00BA) of the buffer memory.

(c) By turning off the E^2PROM erasure request (YnD), the E^2PROM erasure abnormal completion (XnE) turns off.

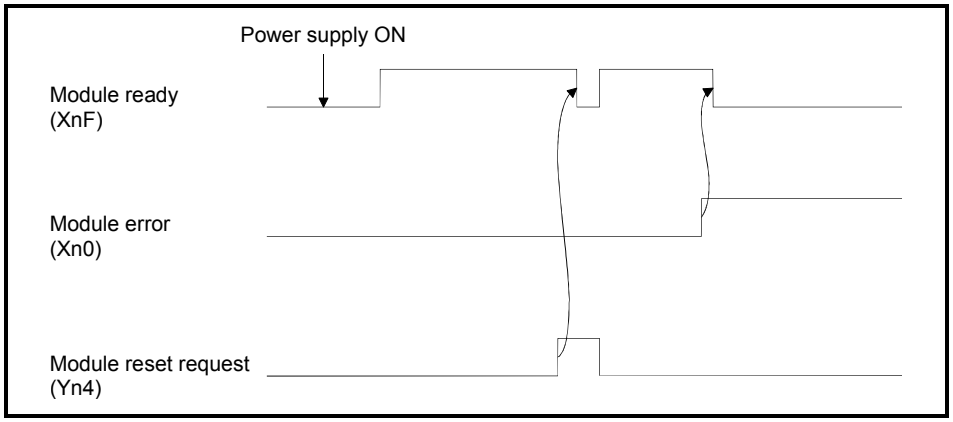


(14) Module ready: XnF

Indicates if the module is ready for operation.

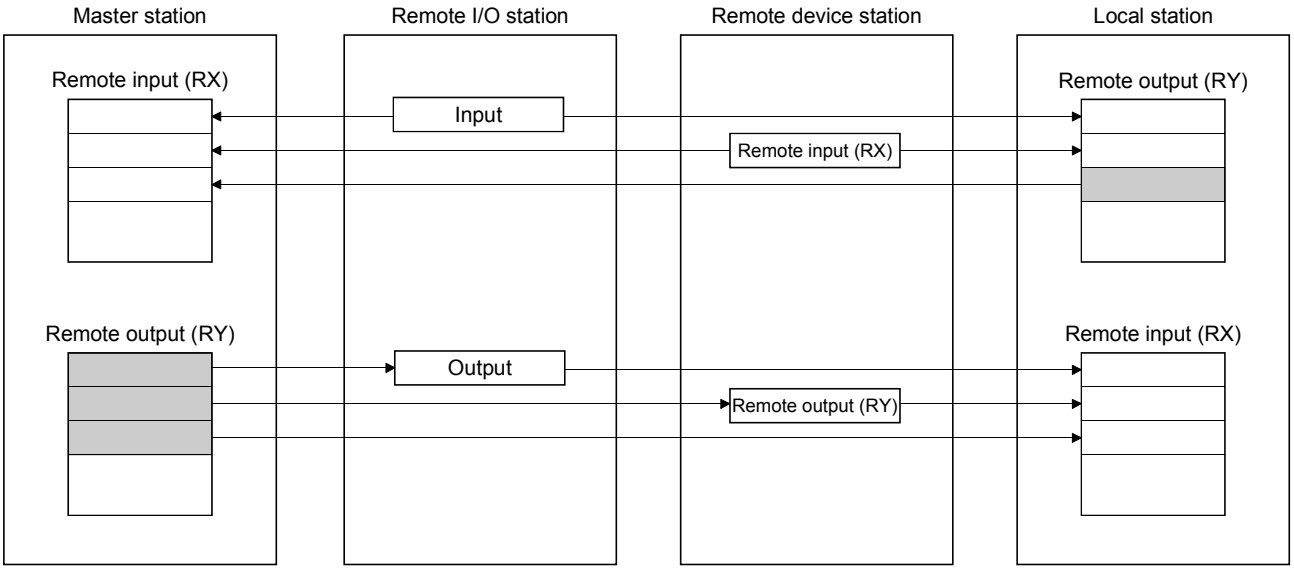
(a) Turns on automatically when the module becomes ready for operation
Used as an interlock signal when a sequence program is used to make access to the master/local module.

(b) Turns off when one of the following conditions occur:
- There is an error in the module switch settings.
- The module reset request signal (Yn4) is turned on.
- The module error signal (Xn0) is turned on.



(15) Refresh instruction: Yn0

Indicates if the content of remote output RY (address 160H to 1DFH) in the buffer memory is effective or not. Same meaning for local stations.
For remote input RX and remote register RWr/RWw except remote output RY, refresh is continued independently of this signal.
OFF : Not effective (Sends all-off data.)
ON : Effective (Sends data in "remote output (address 160H to 1DFH)" in the buffer memory.)



POINT
(1) Yn0 is set (on) before the data link start up. (2) Yn0 is turned off when the programmable controller CPU is in the STOP status.

(16) Module reset request: Yn4

Signal used to reset the module for debugging.
The module can be reset individually without resetting the programmable controller CPU.
If you cannot start the remote station earlier than starting the system in any method, resetting the module after the start of the remote station allows the system to start from the initial status securely.
Refer to (5) for signal timing.

(17) Data link startup request from buffer memory parameter: Yn6

Starts data link according to the parameter (address 0_H to $5F_H$) contents in buffer memory.
Do not turn on this signal during RUN of the programmable controller CPU and during a data link.
If you are going to change any parameter data during RUN of the programmable controller CPU and during a data link, always turn on SB0002 (data link stop) to stop the data link, change the parameter data, and then turn on this signal to restart the data link.
Refer to (6) and (7) for signal timing.

(18) Data link startup request from E^2PROM parameter: Yn8

Starts data link according to the parameter contents registered in E^2PROM.
Do not turn on this signal during RUN of the programmable controller CPU and during a data link.
If you are going to change any parameter data during RUN of the programmable controller CPU and during a data link, always turn on SB0002 (data link stop) to stop the data link, change the parameter data, and then turn on this signal to restart the data link.
Refer to (8) and (9) for signal timing.

POINT
The factory-set E^2PROM values are inconsistent. Before executing a data link start with the Yn8 signal, always execute parameter registration with the YnA signal at least once.

(19) Parameter registration request to E^2PROM: YnA

The signal for registering parameter (address 0_H to $5F_H$) in buffer memory to E^2PROM.
Refer to (10) and (11) for signal timing.
Since parameter registration to E^2PROM is limited to 10,000 times, execute parameter registration with the YnA signal a minimum required number of times.

(20) E^2PROM erasure request: YnD

The signal for erasing the parameters in the E^2PROM.
Refer to (12) and (13) for the signal timing.

3.5 Buffer Memory

The buffer memory is used to swap data between the master/local module and the programmable controller CPU.
In the programmable controller CPU, the FROM/TO instructions are used to read/write data.
The contents of the buffer memory return to the default values when the power is turned off and the programmable controller CPU is reset.

3.5.1 Buffer memory list

The buffer memory list is shown in Table 3.4.
When using a master/local module as a standby master station, refer to the respective columns under "Availability" in the table as explained below.

- When a standby master station is operating as a master station: "Master station" column
- When a standby master station is operating as a standby master station: "Local station" column

Table 3.4 Buffer memory list (1/2)

Address		Item	Details	Read/write possibility	Availability		Reference
Hex.	Dec.				Master station	Local station	
0_H to $5F_H$	0 to 95	Parameter information area	Stores the information (parameters) to execute the data link.	Read/write enabled	○ (Not available when a standby master station is controlling the system)	×	Section 3.5.2 (1)
60_H to $7F_H$	96 to 127	(Prohibited to use) *	–	–	–	–	–
80_H to CD_H	128 to 205	Parameter information area	Stores the information (parameters) to execute the data link.	Read/write enabled	○ (Not available when a standby master station is controlling the system)	×	Section 15.2.1
CE_H to DF_H	206 to 223	(Prohibited to use) *	–	–	–	–	–
$E0_H$ to $15F_H$	224 to 351	Remote input (RX)	When master station: Stores the input status from the remote/local station.	Read only	○	–	Section 3.5.2 (2)
			When local station: stores the input status from the master station.		–	○	
160_H to $1DF_H$	352 to 479	Remote output (RY)	When master station: Stores the output status of the output to the remote/local station.	Write only	○	–	
			When local station: Stores the output status of the output to the master station.	Read/write enabled	–	○	
$1E0_H$ to $2DF_H$	480 to 735	Remote register (RWw) (Master station: for sending Local station: for sending/receiving)	When master station: Stores the transmission data to the remote/all local stations.	Write only	○	–	Section 3.5.2 (3)
			When local station: Stores the transmission data to the master/other local stations. Also, stores the received data from the remote/other local stations.	Read/write enabled	–	○	

○: Usable ×: Prohibited to use

* Do not write to areas that are prohibited to use. An error may occur.

Table 3.4 Buffer memory list (2/2)

Address		Item	Details	Read/write possibility	Availability		Reference
Hex.	Dec.				Master station	Local station	
2E0H to 3DFH	736 to 991	Remote register (RWr) (Master station: for receiving Local station: for receiving)	When master station: Stores the received data from the remote/local station.	Read only	○	–	Section 3.5.2 (3)
			When local station: Stores the received data from the master station.			○	
3E0H to 5DFH	992 to 1503	(Prohibited to use)*	–	–	–	–	–
5E0H to 5FFH	1504 to 1535	Link special relay (SB)	Stores the data-link status.	Read/write enabled (write disabled depending on the device)	○	○	Section 3.5.2 (4)
600H to 7FFH	1536 to 2047	Link special register (SW)	Stores the data-link status.				Section 3.5.2 (5)
800H to 9FFH	2048 to 2559	(Prohibited to use)*	–	–	–	–	–
A00H to FFFH	2560 to 4095	Random access buffer	Uses for dedicated instruction of RIRD, RIWT, etc.	Read/write enabled	○	○	Section 15.6
1000H to 1FFFH	4096 to 8191	Transmission and receiving buffer	Stores the transmission and received data and the control data when a transient transmission (communication using the transmission and receiving buffer) is made with the intelligent device stations. The area for each intelligent device station is set with the network parameters.	Read/write enabled	○	○	Section 15.2.1
2000H to 2FFFH	8192 to 12287	Automatic updating buffer	Stores the automatic updating data when a transient transmission (communication using the automatic updating buffer) is made with the intelligent device stations. The area for each intelligent device station is set with the network parameters.	Read/write enabled	○	–	Section 15.2.1

○: Usable ×: Prohibited to use

* Do not write to areas that are prohibited to use. An error may occur.

3.5.2 Buffer memory details

The details of each item shown in Table 3.4 of Section 3.5.1 is described.

(1) Parameter information area

The conditions to perform data link is set.
Also, these can be registered in the E^2PROM.

Table 3.5 Parameter information area list

Address		Item	Description	Default
Hex.	Dec.			
0H	0	(Prohibited to use) ＊	–	–
1H	1	Number of connected modules	Set the number of connected remote/local station modules. (including reserved stations)	64
2H	2	Number of retries	Set the number of retries to the communication faulty station.	3
3H	3	Number of automatic return modules	Set the number of remote/local stations modules that can return with 1 link scan.	1
4H	4	(Prohibited to use) ＊	–	–
5H	5	(Prohibited to use) ＊	–	–
6H	6	Operation specification when CPU is down	Specify the data-link status when there is a master station programmable controller CPU error.	0 (Stop)
7H to FH	7 to 15	(Prohibited to use) ＊	–	–
10H to 13H	16 to 19	Reserved station specification	Set a reserved station.	0 (No specification)
14H to 17H	20 to 23	Invalid station specification	Specify an invalid station.	0 (No specification)
18H to 1FH	24 to 31	(Prohibited to use) ＊	–	–
20H to 5FH	32 to 95	Station information	Set the connected remote/local station type.	Station type: Remote I/O station Number of occupied stations: 1 Station numbers: 1 to 64

＊ Do not write to areas that are prohibited to use. An error may occur.

(a) Number of connected modules

This sets the number of remote/local station modules connected to the master station (including reserved stations).
This is not a station count.
The setting range is "1 to 64 (modules)."

POINT
The station information (address 20H to 5FH) for the specified "number of connected" stations becomes valid.

(b) Number of retries

This sets the number of retries to the remote/local station with a data link error.
The setting range is "1 to 7 (times)."
If the remote/local station cannot recover a normal data link after performing specified number of retries, the station becomes a "data-link faulty station."

(c) Number of automatic return modules

This sets the number of remote/local stations that can return to the system during 1 link scan.
The range is "1 to 10 (modules)."

(d) Operation specification when CPU is down

This specifies the data-link status when the master station programmable controller CPU has an error which "stops the error operation".
"0" is stop and "1" is continue.

(e) Reserved station specification

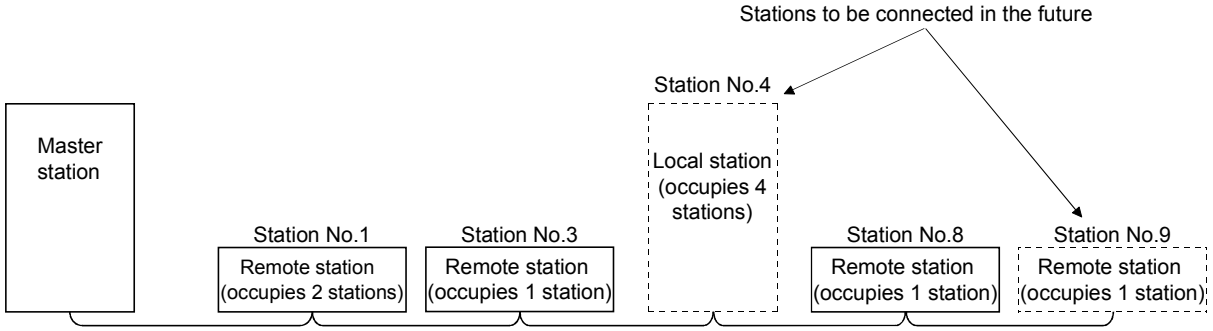
This is set to include the remote/local stations that are not actually connected in the number of connected modules, so that a data link error does not occur.

① When a connected remote/local station is set as a reserved station, the station cannot perform any data link at all.

② Turn on the bit corresponding to the station number to be set as reserved.
However, for the remote/local station that occupies more than 2 stations, turn on the only bit for the station numbers set by the module's station number setting switch.
1 to 64 in the table below indicate the station numbers.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
10H	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
11H	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
12H	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
13H	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

<Setting example>
When setting a local station with station number 4 and a remote station with station number 9 as reserved in the system configuration below:



Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
10H	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
11H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(f) Error invalid station specification

This is set so that the remote/local station that can no longer perform data link due to power off, etc. will not be treated as a "data-link faulty station" on the master station and the local station.

Be careful, however, for errors will not be detected.

① When the same station number is specified as a reserved station, the reserved station specification has the priority.

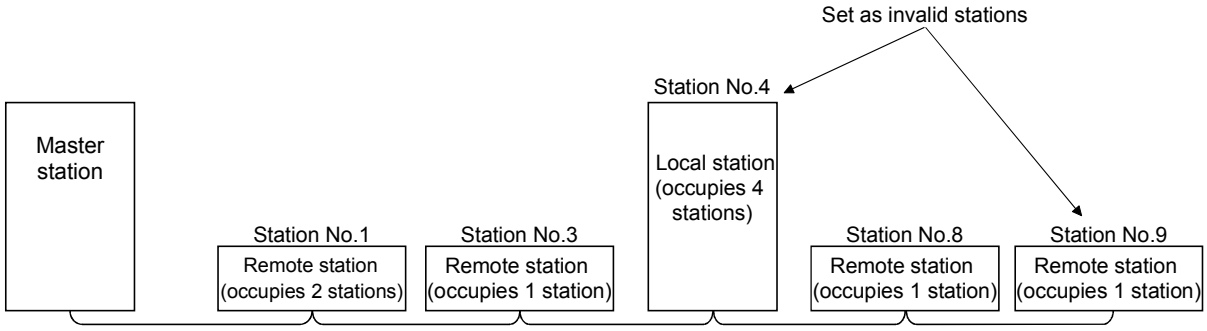
② Turn on the bit corresponding to the station number of the invalid station. However, for remote/local stations that occupy more than 2 stations, turn on the only bit for the station numbers set by the module's station number setting switch.

1 to 64 in the table below indicate the station numbers.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
14H	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
15H	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
16H	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
17H	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

<Setting example>

When setting a local station with station number 4 and a remote station with station number 9 as invalid in the system configuration below:

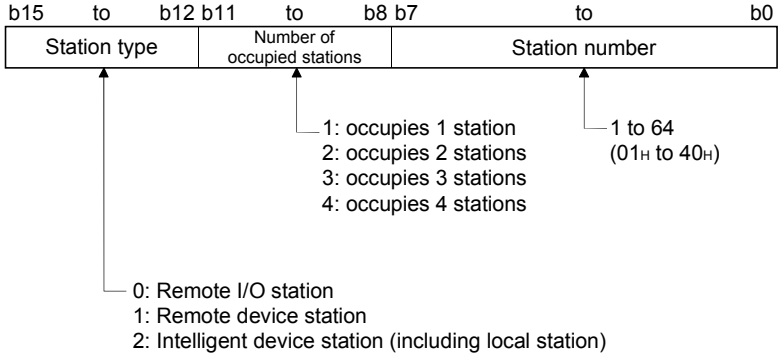


Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
10H	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
11H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(g) Station information

This sets the remote/local station type for connected remote/local stations and reserved stations.

① The data configuration to be set is shown below.



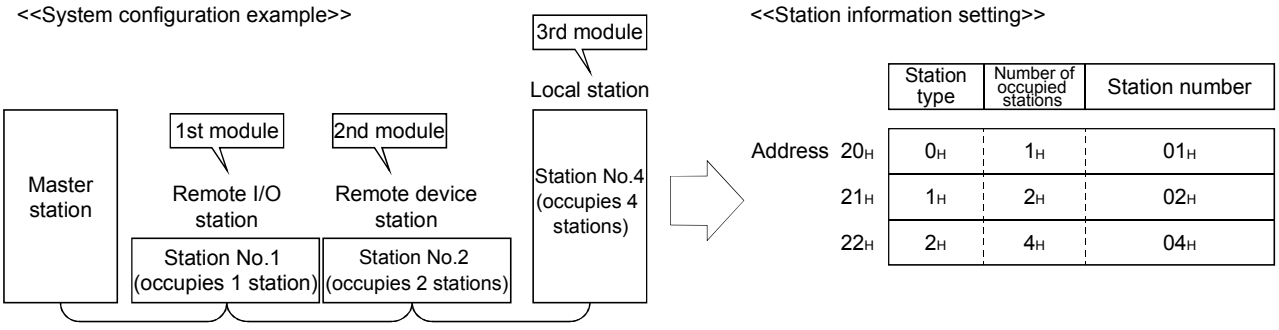
② The buffer memory address for each module is shown in the table below.

For example, when setting for the 25th module, write to the buffer memory address "38H."

Module	Address	Module	Address	Module	Address	Module	Address
1st module	20H	17th module	30H	33rd module	40H	49th module	50H
2nd module	21H	18th module	31H	34th module	41H	50th module	51H
3rd module	22H	19th module	32H	35th module	42H	51st module	52H
4th module	23H	20th module	33H	36th module	43H	52nd module	53H
5th module	24H	21st module	34H	37th module	44H	53rd module	54H
6th module	25H	22nd module	35H	38th module	45H	54th module	55H
7th module	26H	23rd module	36H	39th module	46H	55th module	56H
8th module	27H	24th module	37H	40th module	47H	56th module	57H
9th module	28H	25th module	38H	41st module	48H	57th module	58H
10th module	29H	26th module	39H	42nd module	49H	58th module	59H
11th module	2AH	27th module	3AH	43rd module	4AH	59th module	5AH
12th module	2BH	28th module	3BH	44th module	4BH	60th module	5BH
13th module	2CH	29th module	3CH	45th module	4CH	61st module	5CH
14th module	2DH	30th module	3DH	46th module	4DH	62nd module	5DH
15th module	2EH	31st module	3EH	47th module	4EH	63rd module	5EH
16th module	2FH	32nd module	3FH	48th module	4FH	64th module	5FH

<Setting example>

When connecting a remote I/O station, a remote device station and a local station:

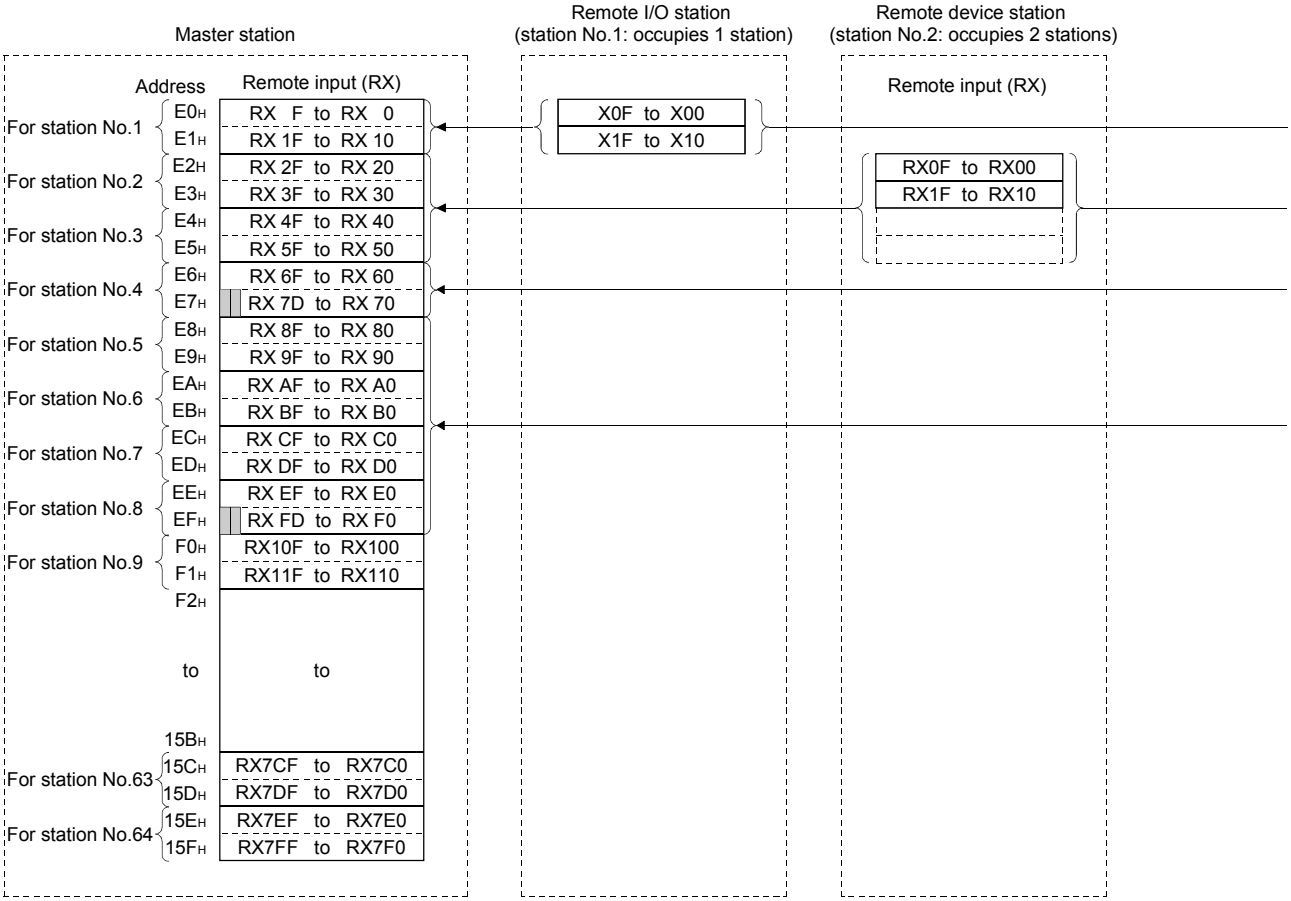


(2) Remote input (RX) and remote output (RY)

(a) Master station ← Remote I/O station/remote device station/ local station

① Master station

- Input status from remote I/O station, remote device station (RX) and local station (RY) are stored.
- Two words are used per station.



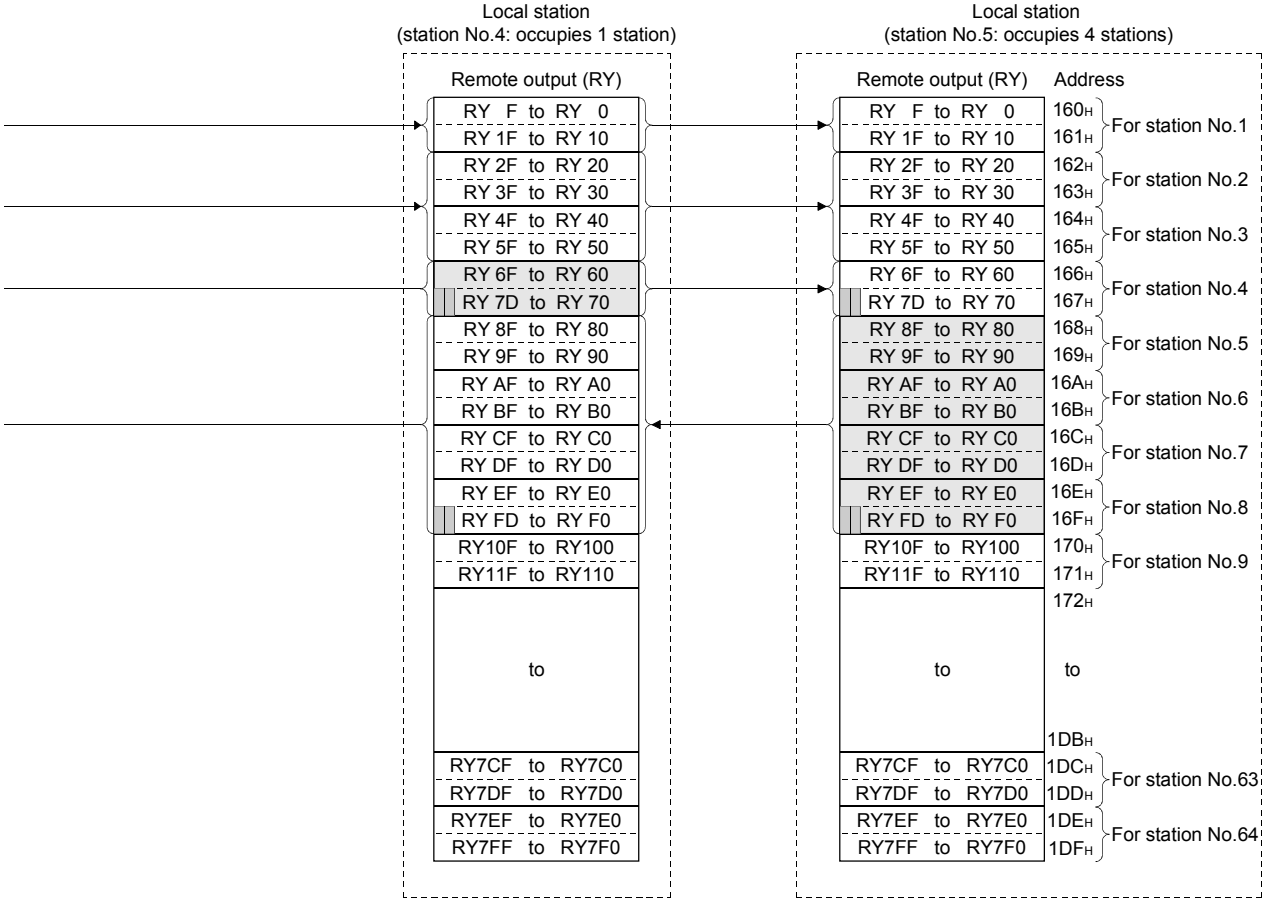
Master station's buffer memory and station number correspondence table

Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address
1	E0H to E1H	14	FAH to FBH	27	114H to 115H	40	12EH to 12FH	53	148H to 149H
2	E2H to E3H	15	FCH to FDH	28	116H to 117H	41	130H to 131H	54	14AH to 14BH
3	E4H to E5H	16	FEH to FFH	29	118H to 119H	42	132H to 133H	55	14CH to 14DH
4	E6H to E7H	17	100H to 101H	30	11AH to 11BH	43	134H to 135H	56	14EH to 14FH
5	E8H to E9H	18	102H to 103H	31	11CH to 11DH	44	136H to 137H	57	150H to 151H
6	EAH to EBH	19	104H to 105H	32	11EH to 11FH	45	138H to 139H	58	152H to 153H
7	ECH to EDH	20	106H to 107H	33	120H to 121H	46	13AH to 13BH	59	154H to 155H
8	EEH to EFH	21	108H to 109H	34	122H to 123H	47	13CH to 13DH	60	156H to 157H
9	F0H to F1H	22	10AH to 10BH	35	124H to 125H	48	13EH to 13FH	61	158H to 159H
10	F2H to F3H	23	10CH to 10DH	36	126H to 127H	49	140H to 141H	62	15AH to 15BH
11	F4H to F5H	24	10EH to 10FH	37	128H to 129H	50	142H to 143H	63	15CH to 15DH
12	F6H to F7H	25	110H to 111H	38	12AH to 12BH	51	144H to 145H	64	15EH to 15FH
13	F8H to F9H	26	112H to 113H	39	12CH to 12DH	52	146H to 147H	–	–

② Local station

- Data to be sent to master station is stored in the remote output (RY) corresponding to the host station.
- Input status from remote I/O station, remote device station (RX) and other local station are stored.
- Two words are used per station.

▯▯ ... The last 2 bits cannot be used when the master station and the local station are communicating.



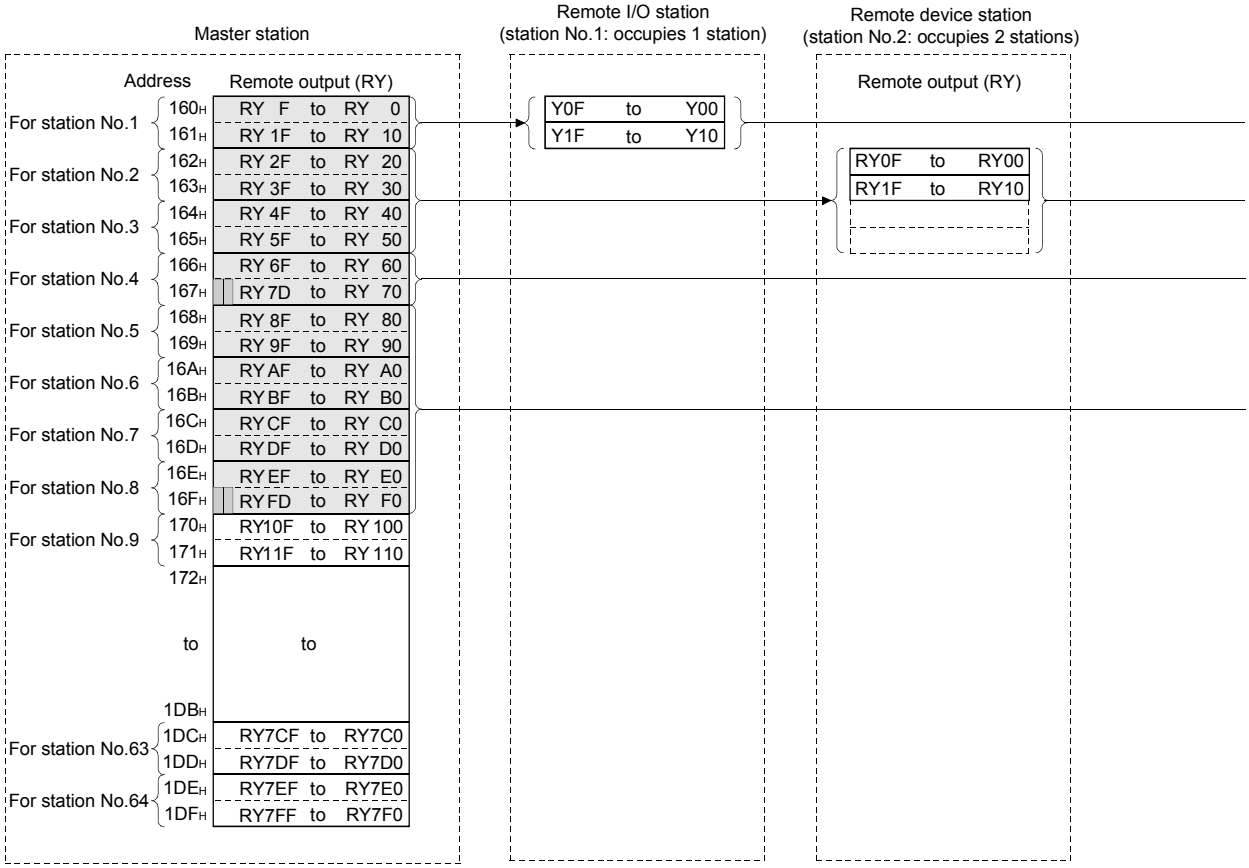
Local station's buffer memory address and station number correspondence table

Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address
1	160H to 161H	14	17AH to 17BH	27	194H to 195H	40	1AEH to 1AFH	53	1C8H to 1C9H
2	162H to 163H	15	17CH to 17DH	28	196H to 197H	41	1B0H to 1B1H	54	1CAH to 1CBH
3	164H to 165H	16	17EH to 17FH	29	198H to 199H	42	1B2H to 1B3H	55	1CCH to 1CDH
4	166H to 167H	17	180H to 181H	30	19AH to 19BH	43	1B4H to 1B5H	56	1CEH to 1CFH
5	168H to 169H	18	182H to 183H	31	19CH to 19DH	44	1B6H to 1B7H	57	1D0H to 1D1H
6	16AH to 16BH	19	184H to 185H	32	19EH to 19FH	45	1B8H to 1B9H	58	1D2H to 1D3H
7	16CH to 16DH	20	186H to 187H	33	1A0H to 1A1H	46	1BAH to 1BBH	59	1D4H to 1D5H
8	16EH to 16FH	21	188H to 189H	34	1A2H to 1A3H	47	1BCH to 1BDH	60	1D6H to 1D7H
9	170H to 171H	22	18AH to 18BH	35	1A4H to 1A5H	48	1BEH to 1BFH	61	1D8H to 1D9H
10	172H to 173H	23	18CH to 18DH	36	1A6H to 1A7H	49	1C0H to 1C1H	62	1DAH to 1DBH
11	174H to 175H	24	18EH to 18FH	37	1A8H to 1A9H	50	1C2H to 1C3H	63	1DCH to 1DDH
12	176H to 177H	25	190H to 191H	38	1AAH to 1ABH	51	1C4H to 1C5H	64	1DEH to 1DFH
13	178H to 179H	26	192H to 193H	39	1ACH to 1ADH	52	1C6H to 1C7H	–	–

(b) Master station → remote I/O station/remote device station/local station

① Master station

- Output status to remote I/O station, remote device station (RY) and all local stations (RX) are stored.
- Two words are used per station.



Master station's buffer memory and station number correspondence table

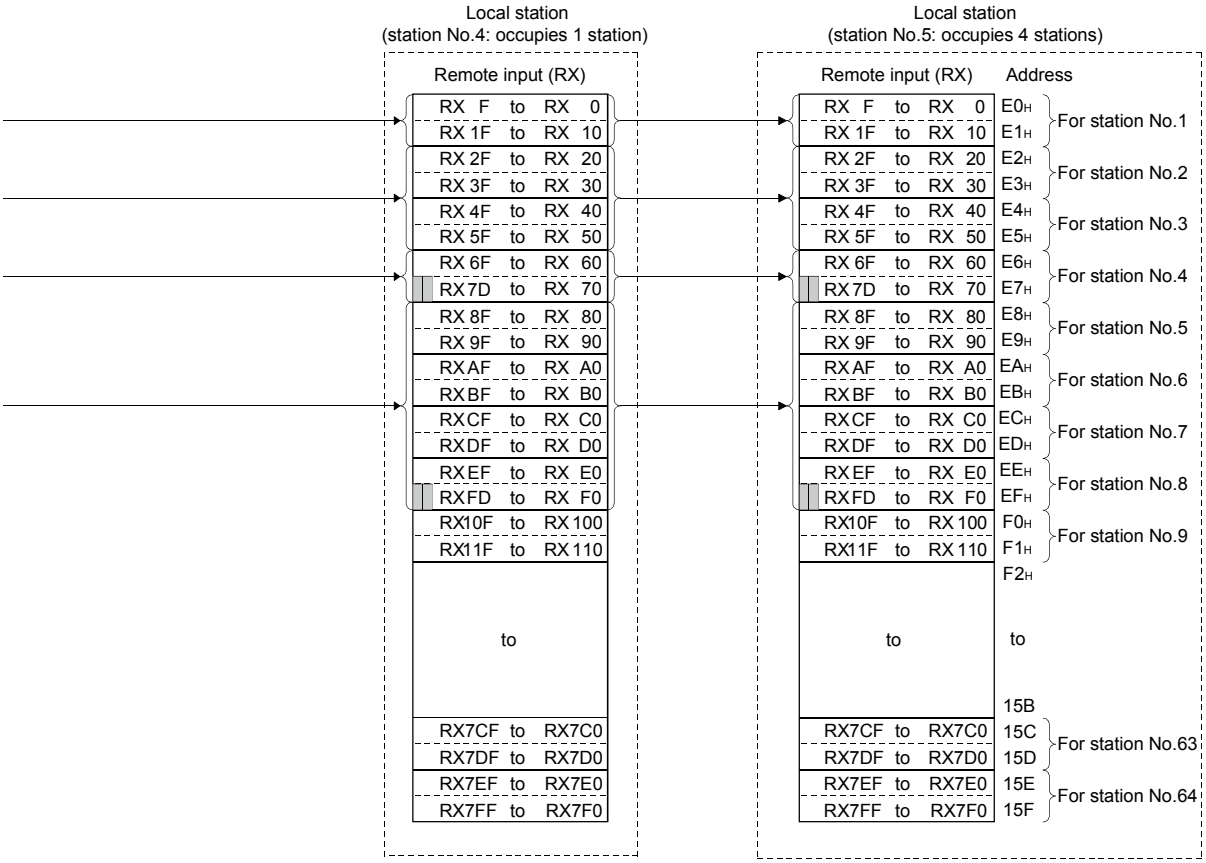
Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address
1	160H to 161H	14	17AH to 17BH	27	194H to 195H	40	1AEH to 1AFH	53	1C8H to 1C9H
2	162H to 163H	15	17CH to 17DH	28	196H to 197H	41	1B0H to 1B1H	54	1CAH to 1CBH
3	164H to 165H	16	17EH to 17FH	29	198H to 199H	42	1B2H to 1B3H	55	1CCH to 1CDH
4	166H to 167H	17	180H to 181H	30	19AH to 19BH	43	1B4H to 1B5H	56	1CEH to 1CFH
5	168H to 169H	18	182H to 183H	31	19CH to 19DH	44	1B6H to 1B7H	57	1D0H to 1D1H
6	16AH to 16BH	19	184H to 185H	32	19EH to 19FH	45	1B8H to 1B9H	58	1D2H to 1D3H
7	16CH to 16DH	20	186H to 187H	33	1A0H to 1A1H	46	1BAH to 1BBH	59	1D4H to 1D5H
8	16EH to 16FH	21	188H to 189H	34	1A2H to 1A3H	47	1BCH to 1BDH	60	1D6H to 1D7H
9	170H to 171H	22	18AH to 18BH	35	1A4H to 1A5H	48	1BEH to 1BFH	61	1D8H to 1D9H
10	172H to 173H	23	18CH to 18DH	36	1A6H to 1A7H	49	1C0H to 1C1H	62	1DAH to 1DBH
11	174H to 175H	24	18EH to 18FH	37	1A8H to 1A9H	50	1C2H to 1C3H	63	1DCH to 1DDH
12	176H to 177H	25	190H to 191H	38	1AAH to 1ABH	51	1C4H to 1C5H	64	1DEH to 1DFH
13	178H to 179H	26	192H to 193H	39	1ACH to 1ADH	52	1C6H to 1C7H	–	–

② Local station

• Data received from remote I/O station, remote device station (RY) and master station (RY) are stored.

• Two words are used per station.

▯▯ ... The last 2 bits cannot be used when the master station and the local station are communicating.



Local station's buffer memory address and station number correspondence table

Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address
1	E0H to E1H	14	FAH to FBH	27	114H to 115H	40	12EH to 12FH	53	148H to 149H
2	E2H to E3H	15	FCH to FDH	28	116H to 117H	41	130H to 131H	54	14AH to 14BH
3	E4H to E5H	16	FEH to FFH	29	118H to 119H	42	132H to 133H	55	14CH to 14DH
4	E6H to E7H	17	100H to 101H	30	11AH to 11BH	43	134H to 135H	56	14EH to 14FH
5	E8H to E9H	18	102H to 103H	31	11CH to 11DH	44	136H to 137H	57	150H to 151H
6	EAH to EBH	19	104H to 105H	32	11EH to 11FH	45	138H to 139H	58	152H to 153H
7	ECH to EDH	20	106H to 107H	33	120H to 121H	46	13AH to 13BH	59	154H to 155H
8	EEH to EFH	21	108H to 109H	34	122H to 123H	47	13CH to 13DH	60	156H to 157H
9	F0H to F1H	22	10AH to 10BH	35	124H to 125H	48	13EH to 13FH	61	158H to 159H
10	F2H to F3H	23	10CH to 10DH	36	126H to 127H	49	140H to 141H	62	15AH to 15BH
11	F4H to F5H	24	10EH to 10FH	37	128H to 129H	50	142H to 143H	63	15CH to 15DH
12	F6H to F7H	25	110H to 111H	38	12AH to 12BH	51	144H to 145H	64	15EH to 15FH
13	F8H to F9H	26	112H to 113H	39	12CH to 12DH	52	146H to 147H	–	–

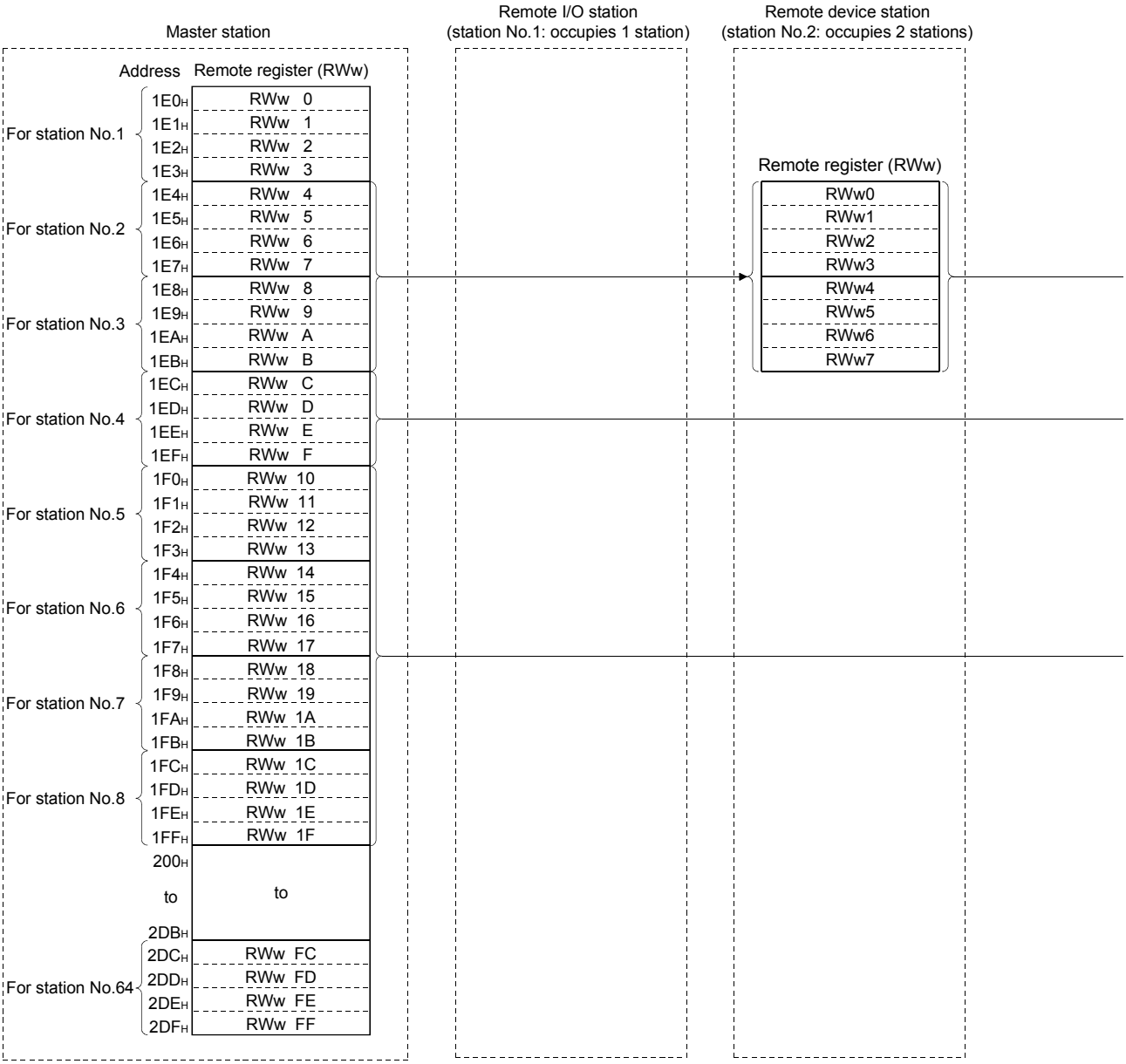
(3) Remote register (RWw) and remote register (RWr)

(a) Master station (RWw) → Remote device station (RWw)/ local station (RWr)

① Master station

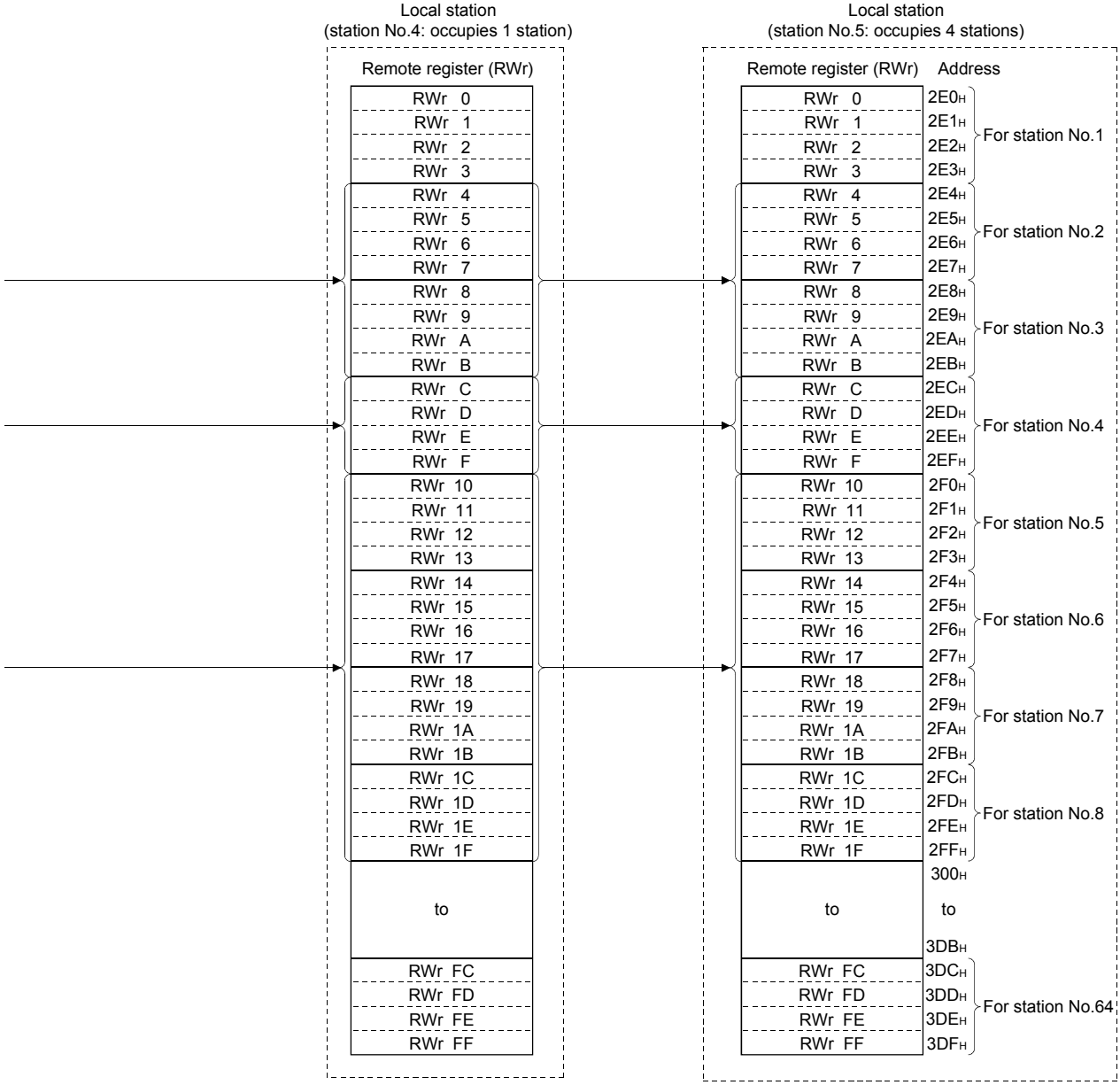
• Data to be sent to remote register at remote device station (RWw) and remote registers of all local stations (RWr) are stored.

• Four words are used per station.



② Local station

- Data sent to the remote register (RWw) of remote device station can also be received.
- Four words are used per station.



Following tables show the relationship between station numbers and buffer memory addresses used.

[Master station]

Station number and buffer memory correspondence table

Station number	Buffer memory address	Station number	Buffer memory address
1	1E0H to 1E3H	33	260H to 263H
2	1E4H to 1E7H	34	264H to 267H
3	1E8H to 1EBH	35	268H to 26BH
4	1ECH to 1EFH	36	26CH to 26FH
5	1F0H to 1F3H	37	270H to 273H
6	1F4H to 1F7H	38	274H to 277H
7	1F8H to 1FBH	39	278H to 27BH
8	1FCH to 1FFH	40	27CH to 27FH
9	200H to 203H	41	280H to 283H
10	204H to 207H	42	284H to 287H
11	208H to 20BH	43	288H to 28BH
12	20CH to 20FH	44	28CH to 28FH
13	210H to 213H	45	290H to 293H
14	214H to 217H	46	294H to 297H
15	218H to 21BH	47	298H to 29BH
16	21CH to 21FH	48	29CH to 29FH
17	220H to 223H	49	2A0H to 2A3H
18	224H to 227H	50	2A4H to 2A7H
19	228H to 22BH	51	2A8H to 2ABH
20	22CH to 22FH	52	2ACH to 2AFH
21	230H to 233H	53	2B0H to 2B3H
22	234H to 237H	54	2B4H to 2B7H
23	238H to 23BH	55	2B8H to 2BBH
24	23CH to 23FH	56	2BCH to 2BFH
25	240H to 243H	57	2C0H to 2C3H
26	244H to 247H	58	2C4H to 2C7H
27	248H to 24BH	59	2C8H to 2CBH
28	24CH to 24FH	60	2CCH to 2CFH
29	250H to 253H	61	2D0H to 2D3H
30	254H to 257H	62	2D4H to 2D7H
31	258H to 25BH	63	2D8H to 2DBH
32	25CH to 25FH	64	2DCH to 2DFH

[Local station]

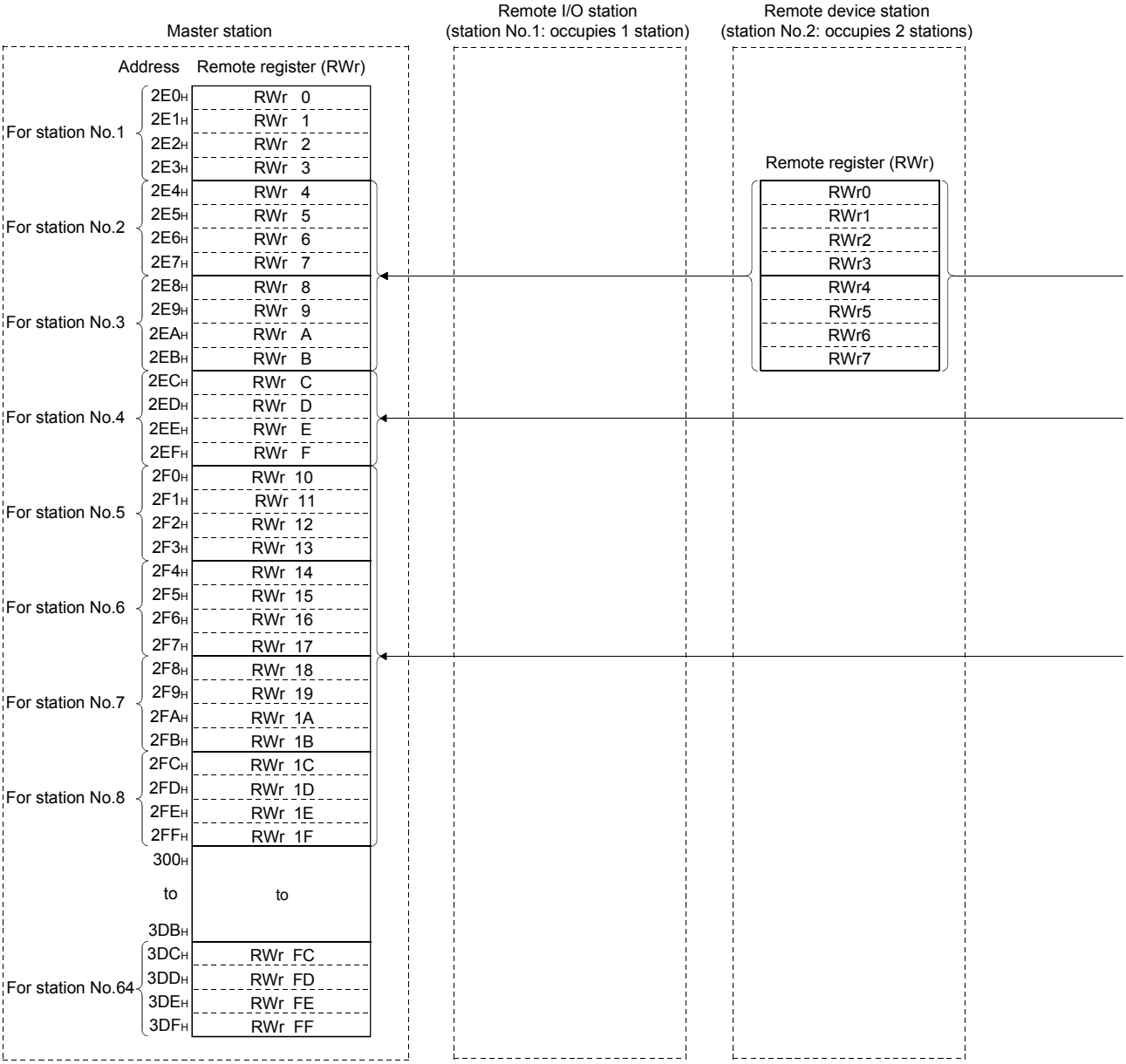
Station number and buffer memory correspondence table

Station number	Buffer memory address	Station number	Buffer memory address
1	2E0H to 2E3H	33	360H to 363H
2	2E4H to 2E7H	34	364H to 367H
3	2E8H to 2EBH	35	368H to 36BH
4	2ECH to 2EFH	36	36CH to 36FH
5	2F0H to 2F3H	37	370H to 373H
6	2F4H to 2F7H	38	374H to 377H
7	2F8H to 2FBH	39	378H to 37BH
8	2FCH to 2FFH	40	37CH to 37FH
9	300H to 303H	41	380H to 383H
10	304H to 307H	42	384H to 387H
11	308H to 30BH	43	388H to 38BH
12	30CH to 30FH	44	38CH to 38FH
13	310H to 313H	45	390H to 393H
14	314H to 317H	46	394H to 397H
15	318H to 31BH	47	398H to 39BH
16	31CH to 31FH	48	39CH to 39FH
17	320H to 323H	49	3A0H to 3A3H
18	324H to 327H	50	3A4H to 3A7H
19	328H to 32BH	51	3A8H to 3ABH
20	32CH to 32FH	52	3ACH to 3AFH
21	330H to 333H	53	3B0H to 3B3H
22	334H to 337H	54	3B4H to 3B7H
23	338H to 33BH	55	3B8H to 3BBH
24	33CH to 33FH	56	3BCH to 3BFH
25	340H to 343H	57	3C0H to 3C3H
26	344H to 347H	58	3C4H to 3C7H
27	348H to 34BH	59	3C8H to 3CBH
28	34CH to 34FH	60	3CCH to 3CFH
29	350H to 353H	61	3D0H to 3D3H
30	354H to 357H	62	3D4H to 3D7H
31	358H to 35BH	63	3D8H to 3DBH
32	35CH to 35FH	64	3DCH to 3DFH

(b) Master station (RWr) ← Remote device station (RWr)/ local station (RWw)

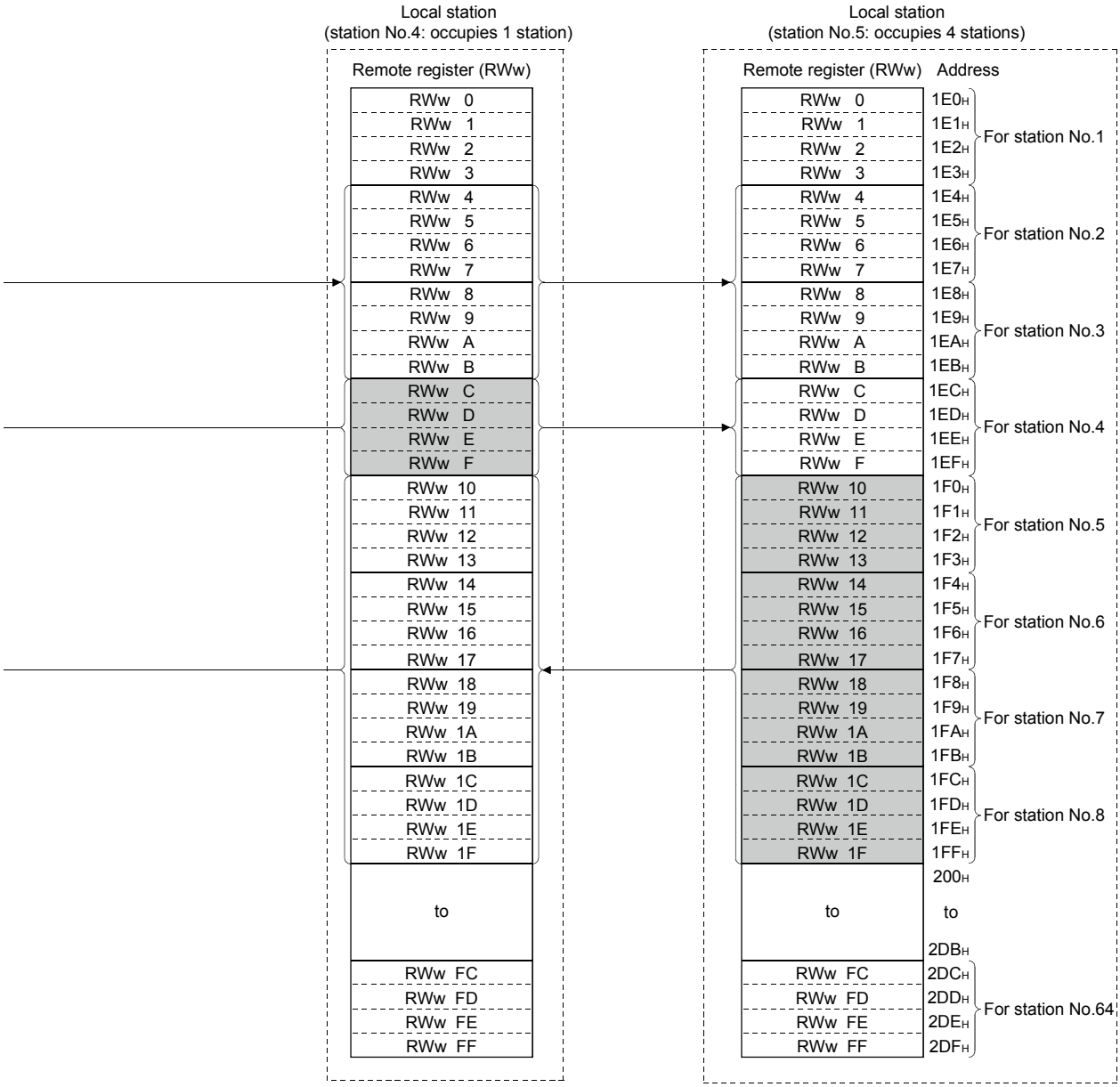
① Master station

- Data to be sent to remote register (RWr) of remote device station and remote register (RWw) of local station are stored.
- Four words are used per station.



② Local station

- Data is sent to the master station and other local stations by storing in the address corresponding to the host station number.
- Data in the remote register (RWr) of remote device station can also be received.



Following tables show the relationship between station numbers and buffer memory addresses used.

[Master station]

Station number and buffer memory correspondence table

Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address
1	2E0H to 2E3H	14	314H to 317H	27	348H to 34BH	40	37CH to 37FH	53	3B0H to 3B3H
2	2E4H to 2E7H	15	318H to 31BH	28	34CH to 34FH	41	380H to 383H	54	3B4H to 3B7H
3	2E8H to 2EBH	16	31CH to 31FH	29	350H to 353H	42	384H to 387H	55	3B8H to 3BBH
4	2ECH to 2EFH	17	320H to 323H	30	354H to 357H	43	388H to 38BH	56	3BCH to 3BFH
5	2F0H to 2F3H	18	324H to 327H	31	358H to 35BH	44	38CH to 38FH	57	3C0H to 3C3H
6	2F4H to 2F7H	19	328H to 32BH	32	35CH to 35FH	45	390H to 393H	58	3C4H to 3C7H
7	2F8H to 2FBH	20	32CH to 32FH	33	360H to 363H	46	394H to 397H	59	3C8H to 3CBH
8	2FCH to 2FFH	21	330H to 333H	34	364H to 367H	47	398H to 39BH	60	3CCH to 3CFH
9	300H to 303H	22	334H to 337H	35	368H to 36BH	48	39CH to 39FH	61	3D0H to 3D3H
10	304H to 307H	23	338H to 33BH	36	36CH to 36FH	49	3A0H to 3A3H	62	3D4H to 3D7H
11	308H to 30BH	24	33CH to 33FH	37	370H to 373H	50	3A4H to 3A7H	63	3D8H to 3DBH
12	30CH to 30FH	25	340H to 343H	38	374H to 377H	51	3A8H to 3ABH	64	3DCH to 3DFH
13	310H to 313H	26	344H to 347H	39	378H to 37BH	52	3ACH to 3AFH	–	–

[Local station]

Station number and buffer memory correspondence table

Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address
1	1E0H to 1E3H	14	214H to 217H	27	248H to 24BH	40	27CH to 27FH	53	2B0H to 2B3H
2	1E4H to 1E7H	15	218H to 21BH	28	24CH to 24FH	41	280H to 283H	54	2B4H to 2B7H
3	1E8H to 1EBH	16	21CH to 21FH	29	250H to 253H	42	284H to 287H	55	2B8H to 2BBH
4	1ECH to 1EFH	17	220H to 223H	30	254H to 257H	43	288H to 28BH	56	2BCH to 2BFH
5	1F0H to 1F3H	18	224H to 227H	31	258H to 25BH	44	28CH to 28FH	57	2C0H to 2C3H
6	1F4H to 1F7H	19	228H to 22BH	32	25CH to 25FH	45	290H to 293H	58	2C4H to 2C7H
7	1F8H to 1FBH	20	22CH to 22FH	33	260H to 263H	46	294H to 297H	59	2C8H to 2CBH
8	1FCH to 1FFH	21	230H to 233H	34	264H to 267H	47	298H to 29BH	60	2CCH to 2CFH
9	200H to 203H	22	234H to 237H	35	268H to 26BH	48	29CH to 29FH	61	2D0H to 2D3H
10	204H to 207H	23	238H to 23BH	36	26CH to 26FH	49	2A0H to 2A3H	62	2D4H to 2D7H
11	208H to 20BH	24	23CH to 23FH	37	270H to 273H	50	2A4H to 2A7H	63	2D8H to 2DBH
12	20CH to 20FH	25	240H to 243H	38	274H to 277H	51	2A8H to 2ABH	64	2DCH to 2DFH
13	210H to 213H	26	244H to 247H	39	278H to 27BH	52	2ACH to 2AFH	–	–

(4) Link special relay (SB)

Data link status is stored in the form of bit on/off information.
Buffer memory address 5E0H to 5FFH corresponds to SB0000 to SB01FF.
Refer to Section 8.4.1 for details of link special relay (SB0000 to SB01FF).
Following table shows the relationship between buffer memory address 5E0H to 5FFH and SB0000 to SB01FF.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
5E0H	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
5E1H	1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	12	11	10
5E2H	2F	2E	2D	2C	2B	2A	29	28	27	26	25	24	23	22	21	20
5E3H	3F	3E	3D	3C	3B	3A	39	38	37	36	35	34	33	32	31	30
5E4H	4F	4E	4D	4C	4B	4A	49	48	47	46	45	44	43	42	41	40
5E5H	5F	5E	5D	5C	5B	5A	59	58	57	56	55	54	53	52	51	50
5E6H	6F	6E	6D	6C	6B	6A	69	68	67	66	65	64	63	62	61	60
5E7H	7F	7E	7D	7C	7B	7A	79	78	77	76	75	74	73	72	71	70
5E8H	8F	8E	8D	8C	8B	8A	89	88	87	86	85	84	83	82	81	80
5E9H	9F	9E	9D	9C	9B	9A	99	98	97	96	95	94	93	92	91	90
5EAH	AF	AE	AD	9AC	AB	AA	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
5EBH	BF	BE	BD	BC	BB	BA	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
5ECH	CF	CE	CD	CC	CB	CA	C9	C8	C7	C6	C5	C4	C3	C2	C1	C0
5EDH	DF	DE	DD	DC	DB	DA	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
5EEH	EF	EE	ED	EC	EB	EA	E9	E8	E7	E6	E5	E4	E3	E2	E1	E0
5EFH	FF	FE	FD	FC	FB	FA	F9	F8	F7	F6	F5	F4	F3	F2	F1	F0
5F0H	10F	10E	10D	10C	10B	10A	109	108	107	106	105	104	103	102	101	100
5F1H	11F	11E	11D	11C	11B	11A	119	118	117	116	115	114	113	112	111	110
5F2H	12F	12E	12D	12C	12B	12A	129	128	127	126	125	124	123	122	121	120
5F3H	13F	13E	13D	13C	13B	13A	139	138	137	136	135	134	133	132	131	130
5F4H	14F	14E	14D	14C	14B	14A	149	148	147	146	145	144	143	142	141	140
5F5H	15F	15E	15D	15C	15B	15A	159	158	157	156	155	154	153	152	151	150
5F6H	16F	16E	16D	16C	16B	16A	169	168	167	166	165	164	163	162	161	160
5F7H	17F	17E	17D	17C	17B	17A	179	178	177	176	175	174	173	172	171	170
5F8H	18F	18E	18D	18C	18B	18A	189	188	187	186	185	184	183	182	181	180
5F9H	19F	19E	19D	19C	19B	19A	199	198	197	196	195	194	193	192	191	190
5FAH	1AF	1AE	1AD	1AC	1AB	1AA	1A9	1A8	1A7	1A6	1A5	1A4	1A3	1A2	1A1	1A0
5FBH	1BF	1BE	1BD	1BC	1BB	1BA	1B9	1B8	1B7	1B6	1B5	1B4	1B3	1B2	1B1	1B0
5FCH	1CF	1CE	1CD	1CC	1CB	1CA	1C9	1C8	1C7	1C6	1C5	1C4	1C3	1C2	1C1	1C0
5FDH	1DF	1DE	1DD	1DC	1DB	1DA	1D9	1D8	1D7	1D6	1D5	1D4	1D3	1D2	1D1	1D0
5FEH	1EF	1EE	1ED	1EC	1EB	1EA	1E9	1E8	1E7	1E6	1E5	1E4	1E3	1E2	1E1	1E0
5FFH	1FF	1FE	1FD	1FC	1FB	1FA	1F9	1F8	1F7	1F6	1F5	1F4	1F3	1F2	1F1	1F0

(5) Link special register (SW)

Data link status is stored in the form of word information.
Buffer memory address 600H to 7FFH corresponds to SW0000 to SW01FF.
Refer to Section 8.4.2 for details of link special register (SW0000 to 01FF).

MEMO

4. FUNCTIONS

This chapter describes the functions.

4.1 Function List

The function list is shown in Table 4.1.

Table 4.1 Function list

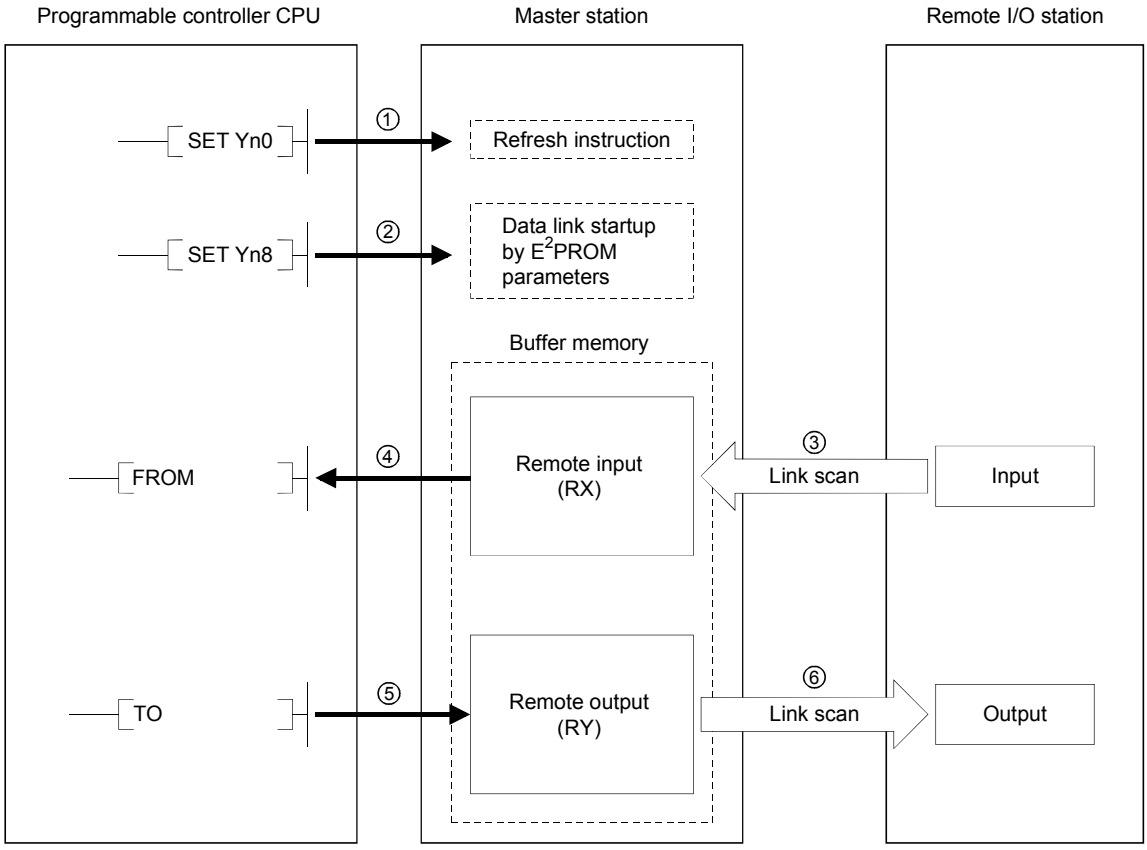
Item		Function summary	Reference	Function availability	
				Master station	Local station
Communication between master and remote I/O stations		Performs on/off data communication with remote I/O station.	Section 4.2	○	×
Communication between master and remote device stations		Performs on/off data and numeric data communication with remote device station.	Section 4.3	○	×
Communication between master and local stations		Performs on/off data and numeric data communication with local station.	Section 4.4	○	○
Communication with compound system		Performs communication with remote I/O, remote device and local stations.	Section 4.5	○	○
Reserved station function		By setting the remote and local stations planned to be connected in the future as reserved stations, these stations will not be treated as error. When specified to an already connected module, data link cannot be performed at all.	Section 4.6	○	×
Error invalid station function		Remote and local stations that can no longer perform data link due to power off, etc., will not be treated as data-link faulty stations.	Section 4.7	○	×
Data-link status setting when a master station programmable controller CPU error occurs		Data-link status can be set when an operation-stop error occurs with the master station programmable controller CPU.	Section 4.8	○	○
Parameter registration to E^2PROM		By registering the parameters in the master module's E^2PROM, the parameters do not have to be written every time the master module is started up.	Section 6.1	○	×
Input data from a data-link faulty station status setting		The status (clear/store) of the input (received) data from the data-link faulty station caused by power off, etc. can be set.	Section 4.9	○	○
Module reset function from a sequence program		When the switch setting is changed or an error occurred with the module, the module can be reset from the sequence program instead of resetting the programmable controller CPU.	Section 4.10	○	○
Data link stop/restart		When executing the data link from Yn6 or Yn8, the data link can be stopped or restarted.	Section 4.11	○	○
RAS function	Automatic return function	When the module removed from the data link due to power off, etc. recovers to normal status, the module automatically joins the data link.	Section 4.12.1	○	○
	Slave station cutoff function	The module which no longer can continue the data link due to power off, etc. is removed from the data link, and the data link is continued with only the normal modules.	Section 4.12.2	○	×
	Data link status check (SB/SW)	The data link status can be checked. Can be used for sequence program interlocking, etc.	Section 8.3	○	○
	Offline test	The following tests can be conducted: • Hardware test ..... Operation check for the individual module • Line test ..... Module connection condition check • Parameter verification test ..... Verify the set parameter contents	Section 7.4 Section 7.7 Section 7.8	○	○
	Online test*	Line tests and link control, such as start and stop are available from peripheral devices.	Section 15.10	○	○
	Monitor/diagnosis	Monitoring and diagnosing are available from peripheral devices.	Section 15.11	○	○

The functions indicated with * are available only when the CPU and software package versions are any of the following:

- Q2ASCPU(S1) of the software version Q or later
- Q2ASHCPU(S1) of the software version Q or later
- Q2ACPU(S1) of the software version E or later
- Q3ACPU of the software version E or later
- Q4ACPU of the software version E or later
- SW21VD-GPPQ/SW2NX-GPPQ or later

4.2 Communication Between the Master Station and Remote I/O Station

The overview of the communication between the master station and remote I/O station is described.



[Data link startup]

① Turn on the refresh instruction (Yn0) and make the remote output (RY) data valid.
When the refresh instruction (Yn0) is off, all the remote output (RY) data is treated as 0 (off).

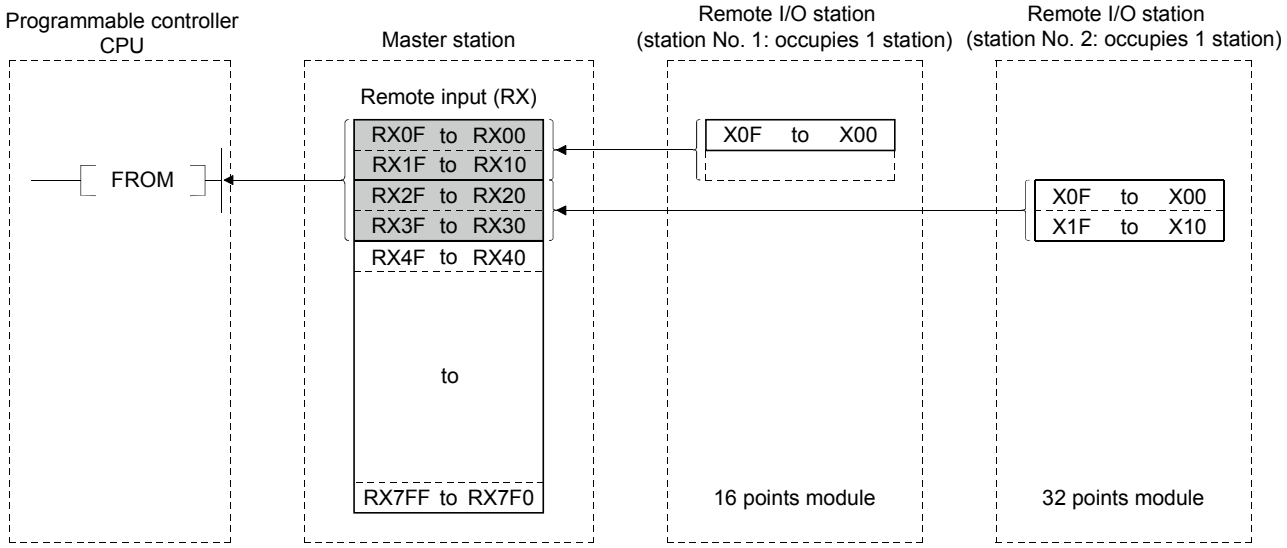
② Turn on the data link startup by the E^2PROM parameters (Yn8), and start the data link.
However, the parameters must be set in E^2PROM beforehand.
When the data link is started normally, the host data link status (Xn1) turns on.

POINT
The data link can be started from the parameters written in the "parameter information area" in the buffer memory. (Refer to Chapter 6.)

[Remote input]

③ The remote I/O station's input status is automatically (for each link scan) stored in the master station's "remote input (RX)" in the buffer memory.

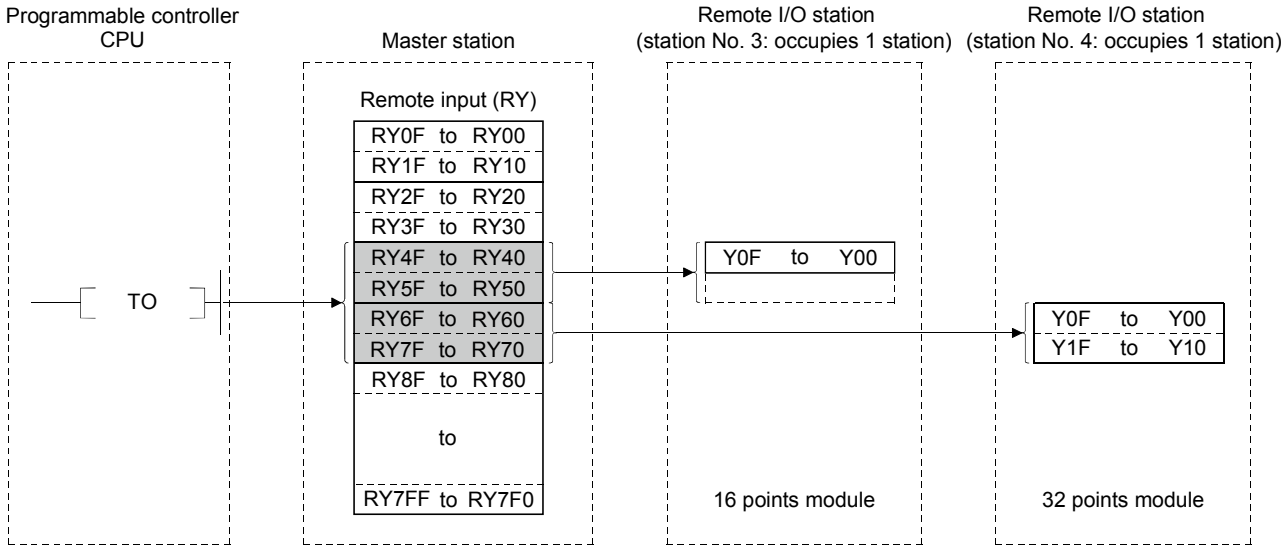
④ The input status stored in the "remote input (RX)" in the buffer memory is received to the programmable controller CPU with the FROM instruction.



[Remote output]

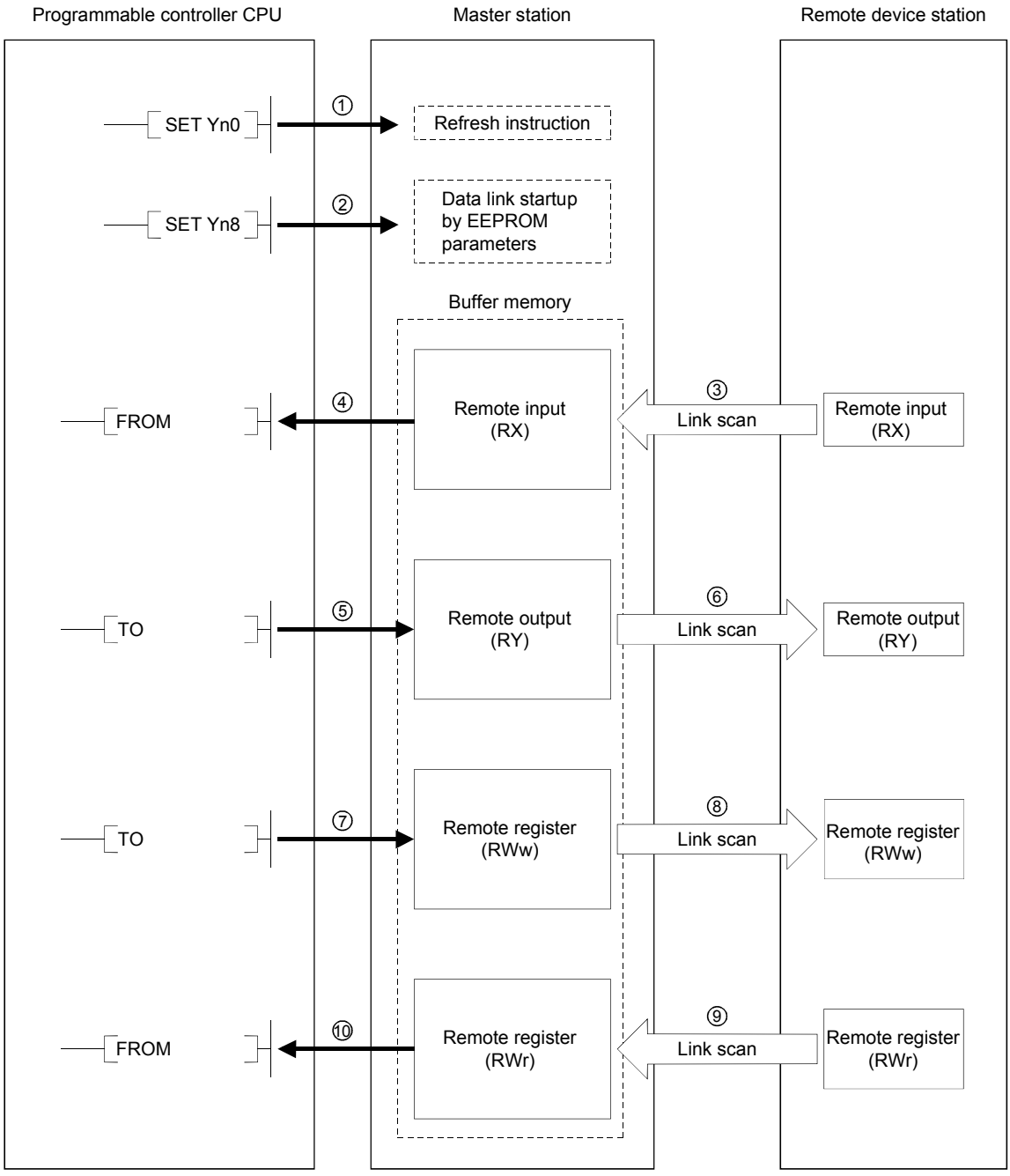
⑤ With the TO instruction, the on/off data output from the remote I/O station is written to the "remote output (RY)" in the buffer memory.

⑥ The output status stored in the "remote output (RY)" in the buffer memory is automatically output (for each link scan) from the remote I/O station.



4.3 Communication Between the Master Station and Remote Device Station

The overview of the communication between the master station and remote device station is described.



[Data link startup]

① Turn on the refresh instruction (Yn0) and make the remote output (RY) data valid. When the refresh instruction (Yn0) is off, all the remote output (RY) data is treated as 0 (off).

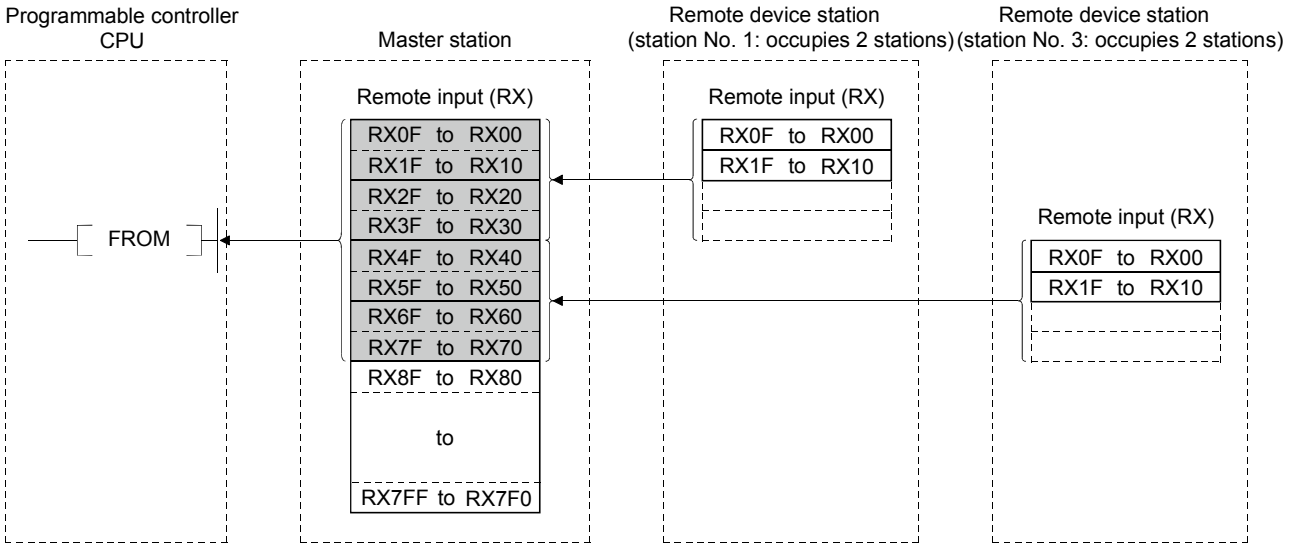
② Turn on the data link startup by the E^2PROM parameters (Yn8), and start the data link.
However, the parameters must be set in E^2PROM beforehand.
When the data link is started normally, the host data link status (Xn1) turns on.

POINT
The data link can be started from the parameters written in the "parameter information area" in the buffer memory. (Refer to Chapter 6.)

[Remote input]

③ The remote device station's remote input (RX) is automatically (for each link scan) stored in the master station's "remote input (RX)" in the buffer memory.

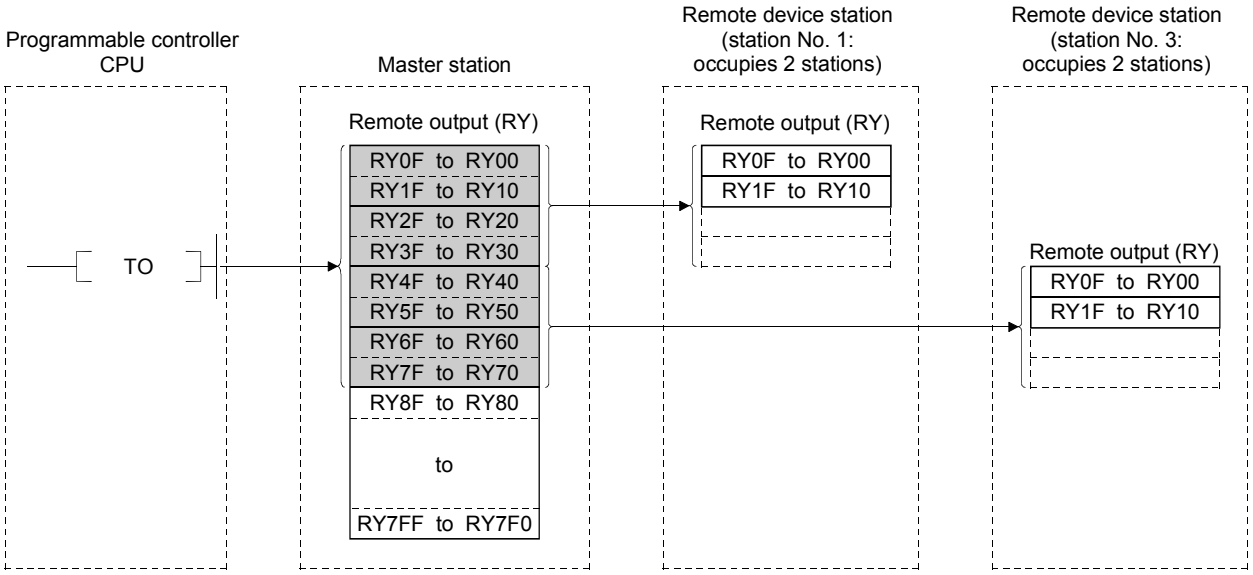
④ The input status stored in the "remote input (RX)" in the buffer memory is received to the programmable controller CPU with the FROM instruction.



[Remote output]

⑤ With the TO instruction, the on/off data in the remote device station's remote output (RY) is written to the "remote output (RY)" in the buffer memory.

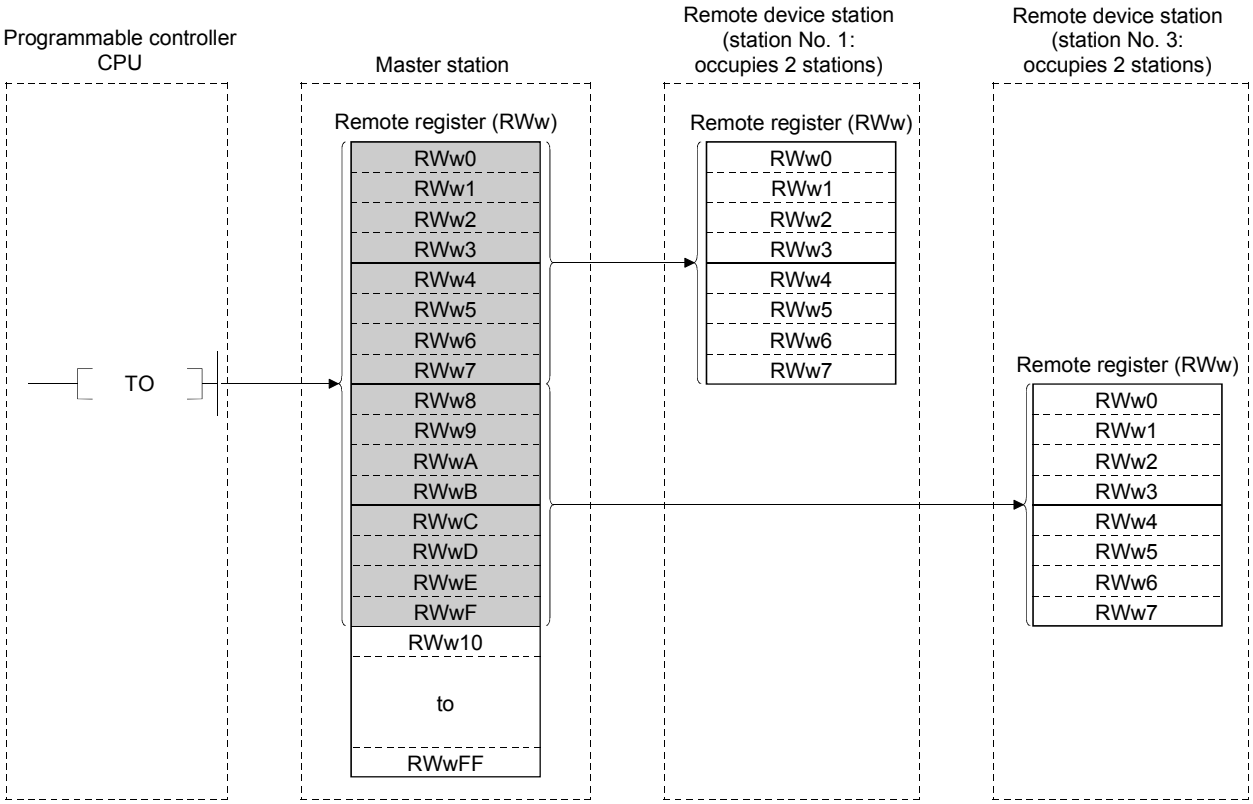
⑥ Depending on the output status stored in the "remote output (RY)" in the buffer memory, the remote device station's remote output (RY) is turned on/off.



[Written to the remote register (RWw)]

⑦ With the TO instruction, the transmission data is written to the "remote register (RWw)" in the buffer memory.

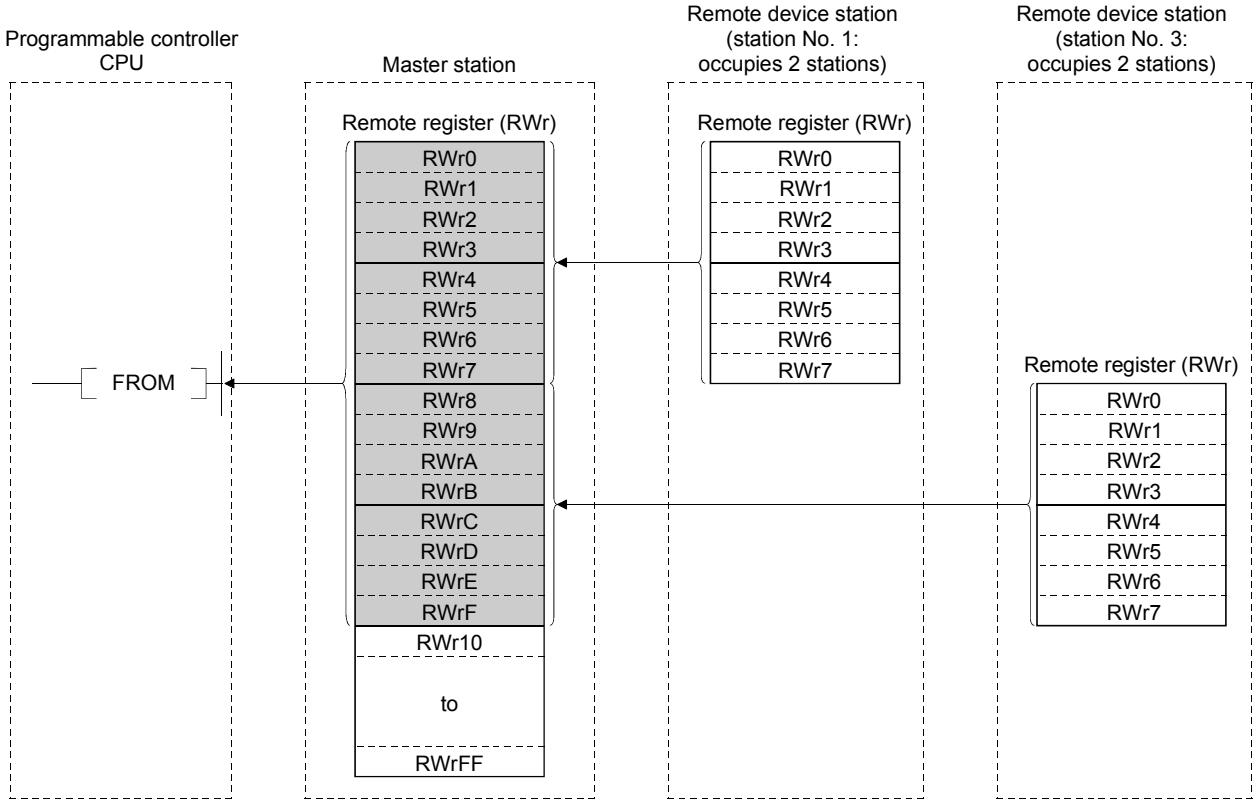
⑧ The data stored in the "remote register (RWw)" in the buffer memory is sent to the remote device station's remote register (RWw).



[Reading from the remote register (RWr)]

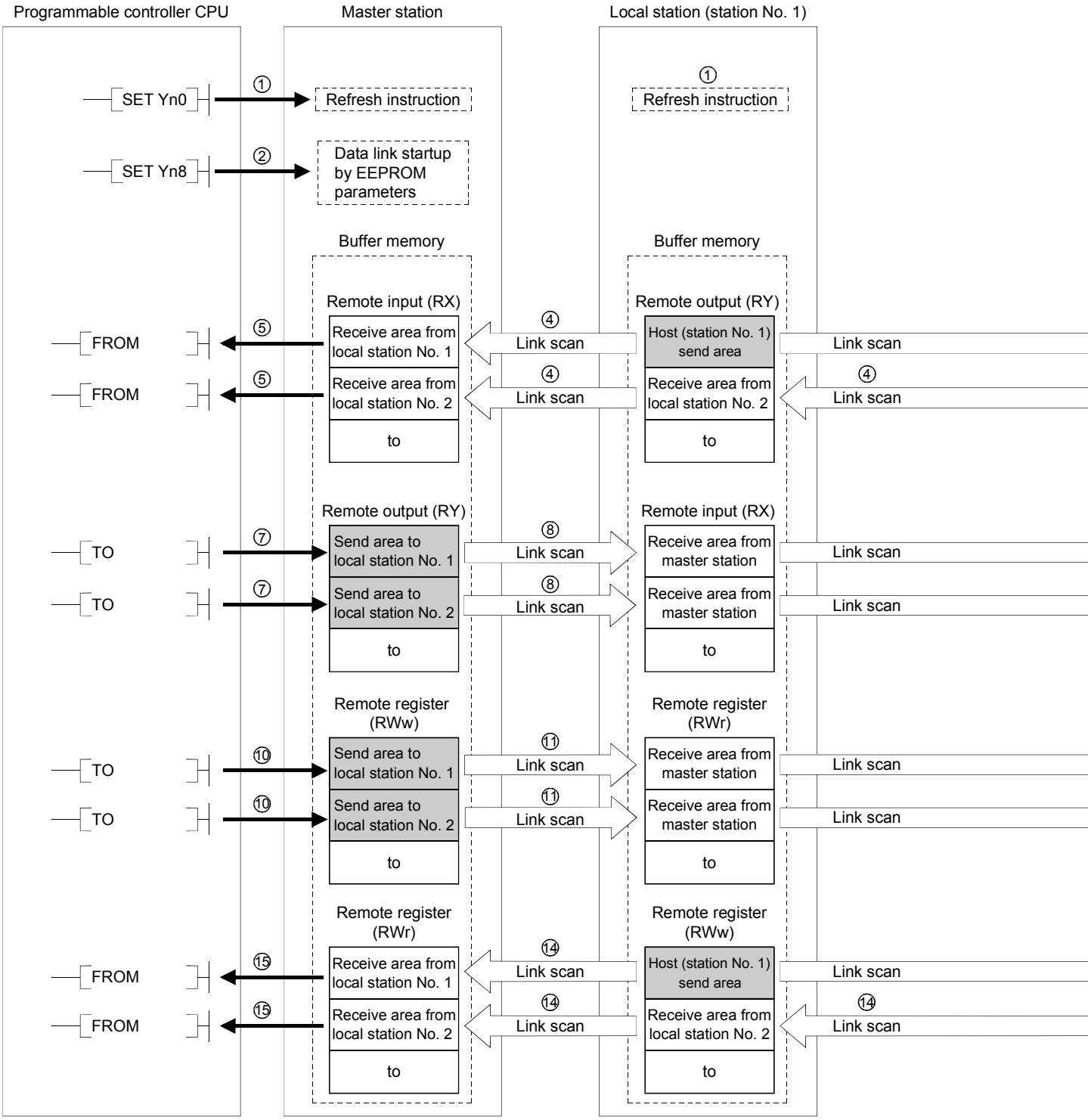
⑨ The data in the remote device station's remote register (RWr) is automatically stored in the master station's "remote register (RWr)" in the buffer memory

⑩ The remote device station's remote register (RWr) data stored in the "remote register (RWr)" in the buffer memory is received to the programmable controller CPU with the FROM instruction.



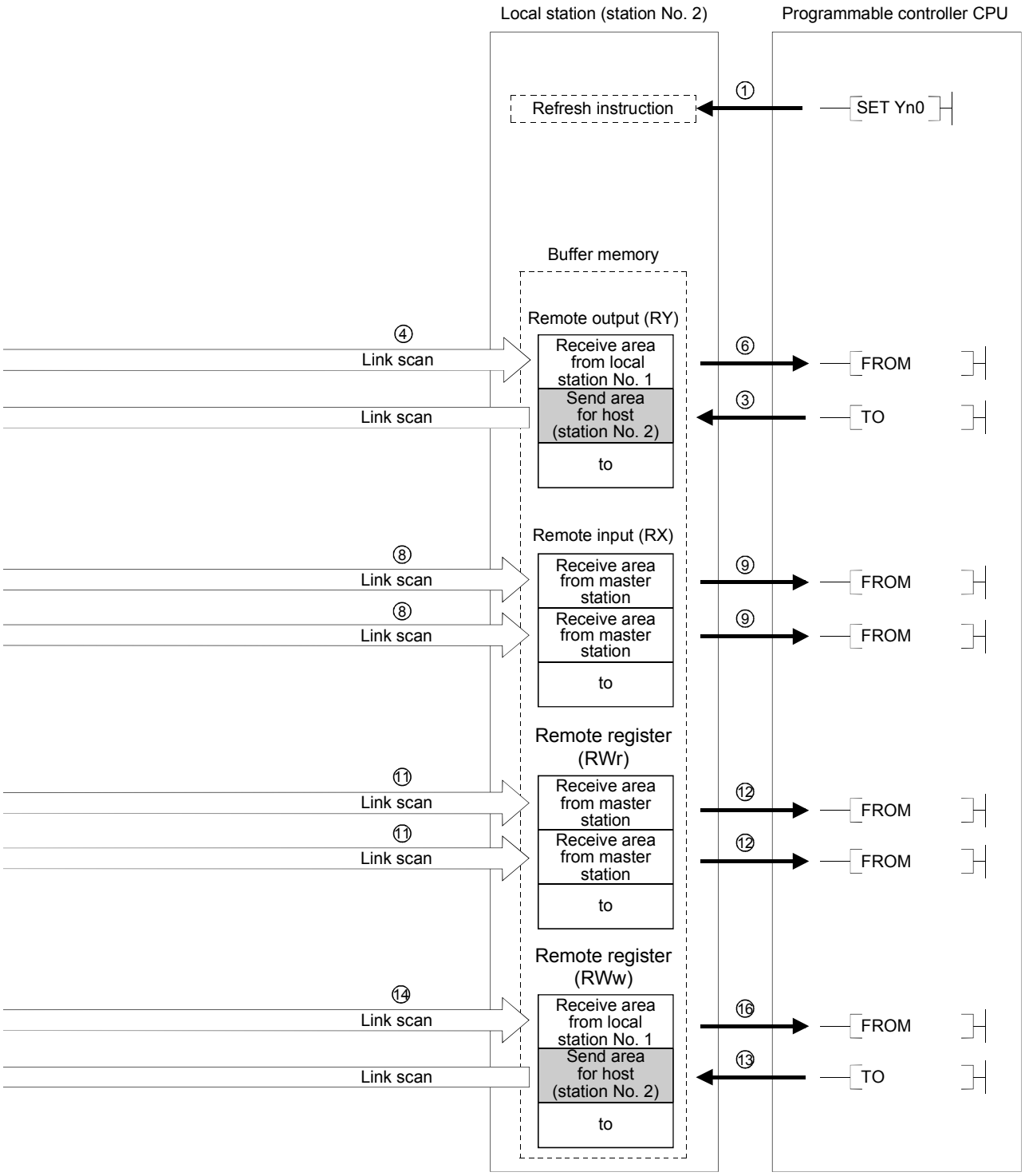
4.4 Communication Between the Master Station and Local Station

The overview of the communication between the master and local stations is described.



POINT

The master station sends only the data for the stations that have started the data link.
The data for the stations that have not started the data link are not sent.


Local station (station No. 2)
Programmable controller CPU
①
Refresh instruction
SET Yn0
Buffer memory
Remote output (RY)
④
Link scan
Receive area from local station No. 1
⑥
FROM
Link scan
Send area for host (station No. 2)
③
TO
to
Remote input (RX)
⑧
Link scan
Receive area from master station
⑨
FROM
⑧
Link scan
Receive area from master station
⑨
FROM
to
Remote register (RWr)
⑪
Link scan
Receive area from master station
⑫
FROM
⑪
Link scan
Receive area from master station
⑫
FROM
to
Remote register (RWw)
⑭
Link scan
Receive area from local station No. 1
⑯
FROM
Link scan
Send area for host (station No. 2)
⑬
TO
to

[Data link startup]

① Turn on the refresh instruction (Yn0) and make the remote output (RY) data valid. When the refresh instruction (Yn0) is off, all the remote output (RY) data is treated as 0 (off).

② Turn on the data link startup by the E^2PROM parameters (Yn8) and start the data link.
However, the parameters must be set in the E^2PROM beforehand.
When the data link is started normally, the host data link status (Xn1) turns on.

POINT

The data link can also be started from the parameters written in the "parameter data area" in the buffer memory. (Refer to chapter 6.)

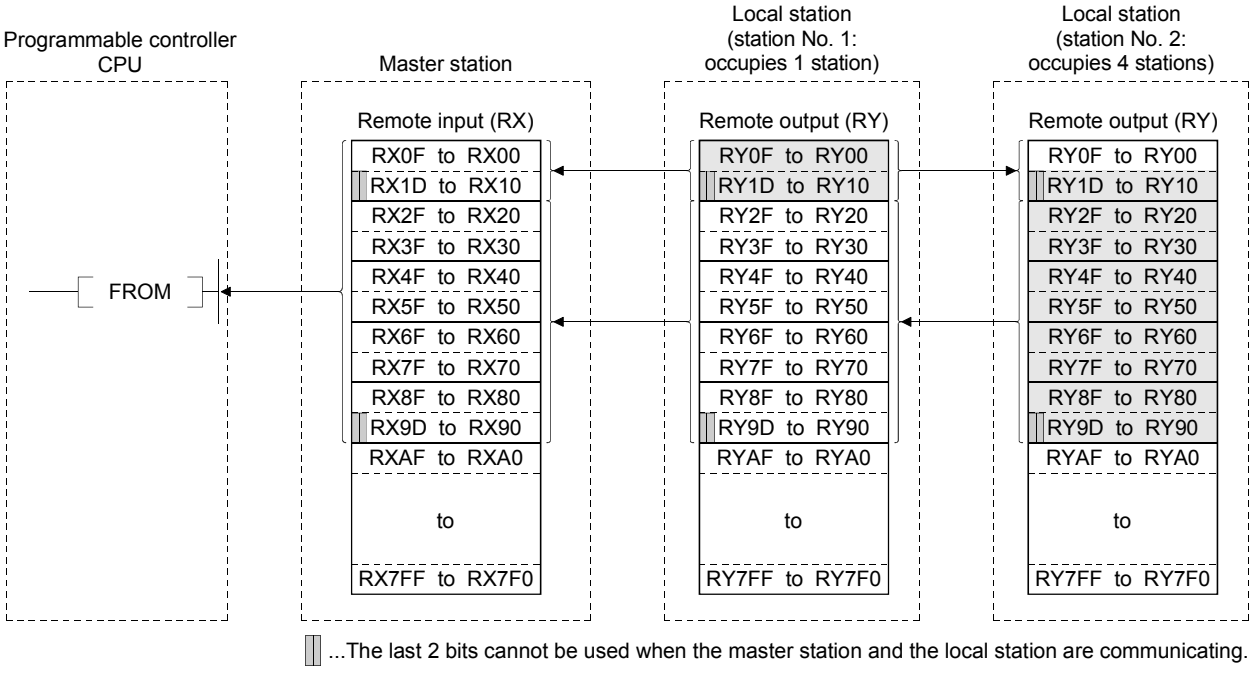
[On/off data from local station → master and other local stations]

③ With the TO instruction, write the on/off data to be sent to the master and other local stations to the local station's "remote output (RY)" in the buffer memory.

④ The data in local station's "remote output (RY)" in the buffer memory is automatically (for each link scan) stored in the master station's "remote input (RX)" in the buffer memory and other local station's "remote output (RY)" in the buffer memory.

⑤ The input status stored in the "remote input (RX)" in the buffer memory is received to the programmable controller CPU with the FROM instruction.

⑥ The input status stored in the "remote output (RY)" in the buffer memory is received to the programmable controller CPU with the FROM instruction.

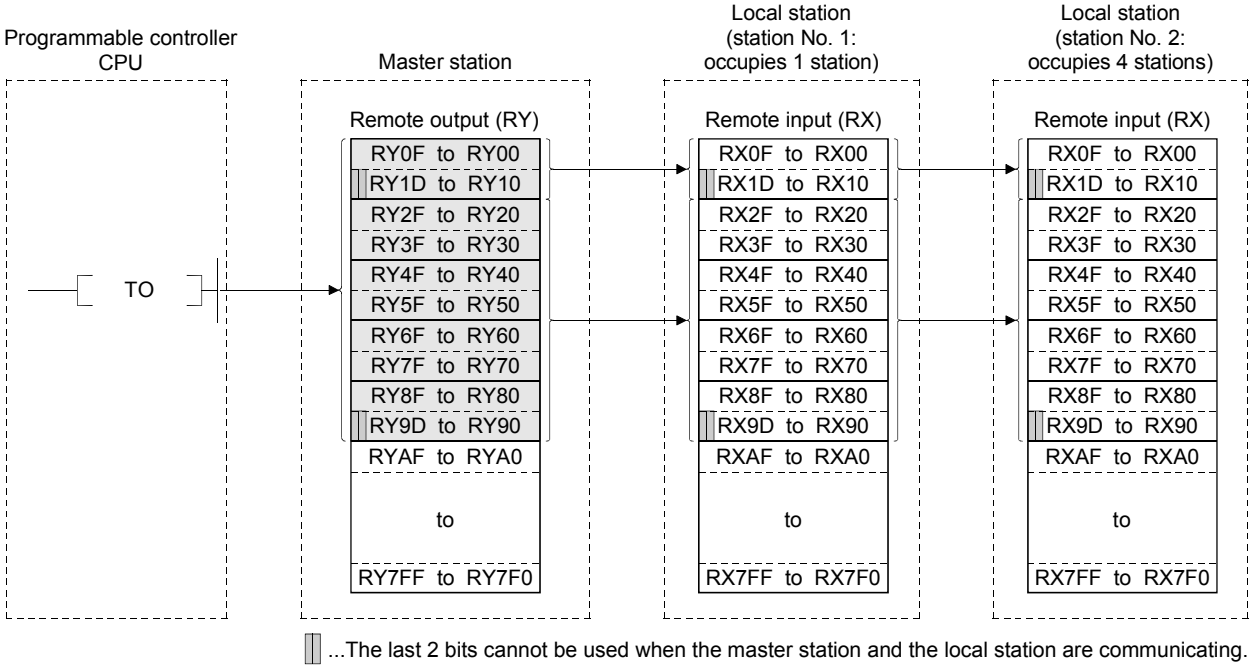


[On/off data from the master station → the local station]

⑦ With the TO instruction, the on/off data to be sent to the local station is written to the master station's "remote output (RY)" in the buffer memory.

⑧ The data in the "remote output (RY)" in the buffer memory is automatically (for each link scan) stored in the local station's remote input (RX) in the buffer memory.

⑨ The input status stored in the "remote input (RX)" in the buffer memory is received to the programmable controller CPU with the FROM instruction.



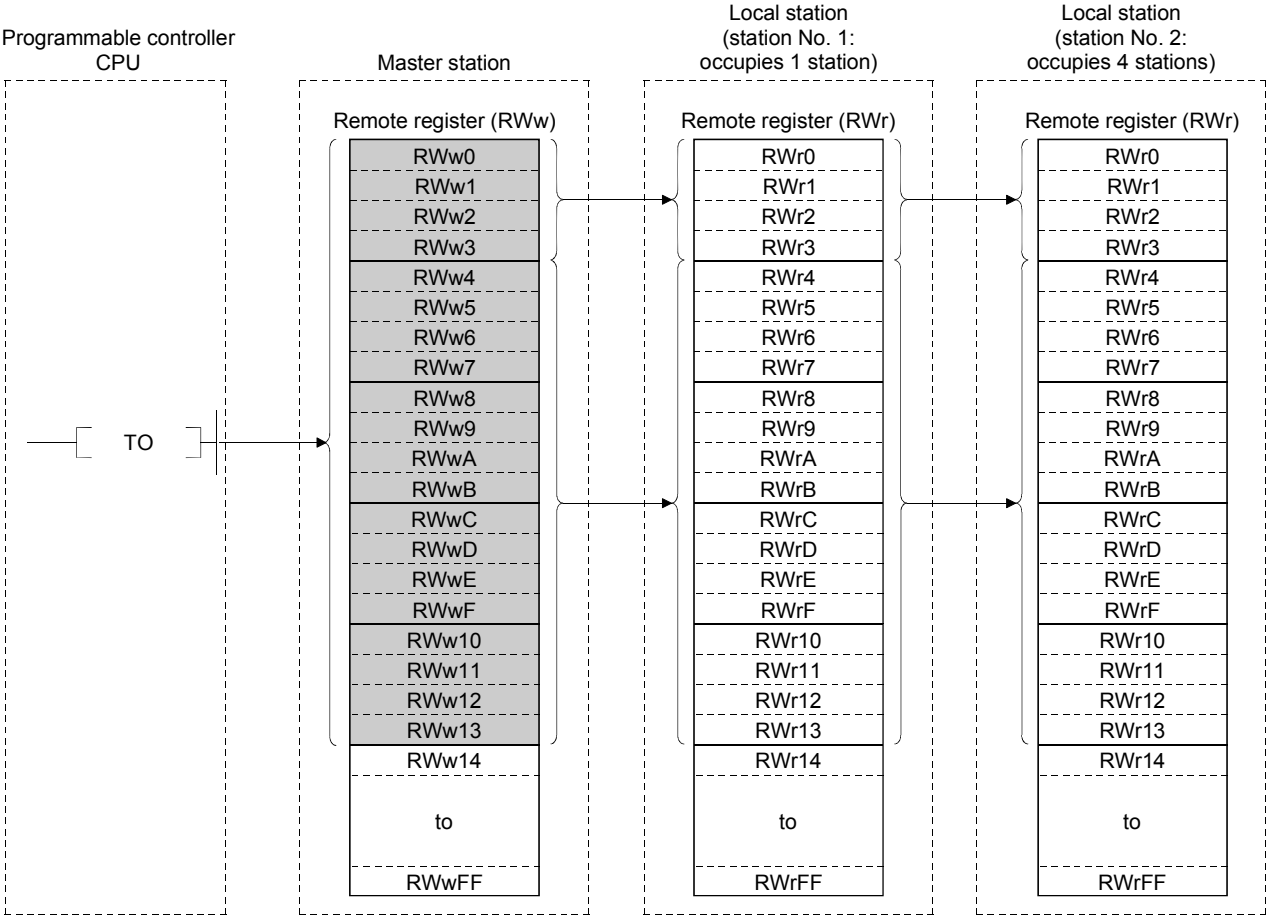
...The last 2 bits cannot be used when the master station and the local station are communicating.

[Word data from the master station to all local stations]

⑩ With the TO instruction, the word data to be sent to all local station is written to the master station's "remote register (RWw)" in the buffer memory.

⑪ The data in the "remote register (RWw)" in the buffer memory is automatically (for each link scan) stored to all local station's "remote registers (RWr)".

⑫ The word data stored in the "remote register (RWr)" in the buffer memory is received to the programmable controller CPU with the FROM instruction.



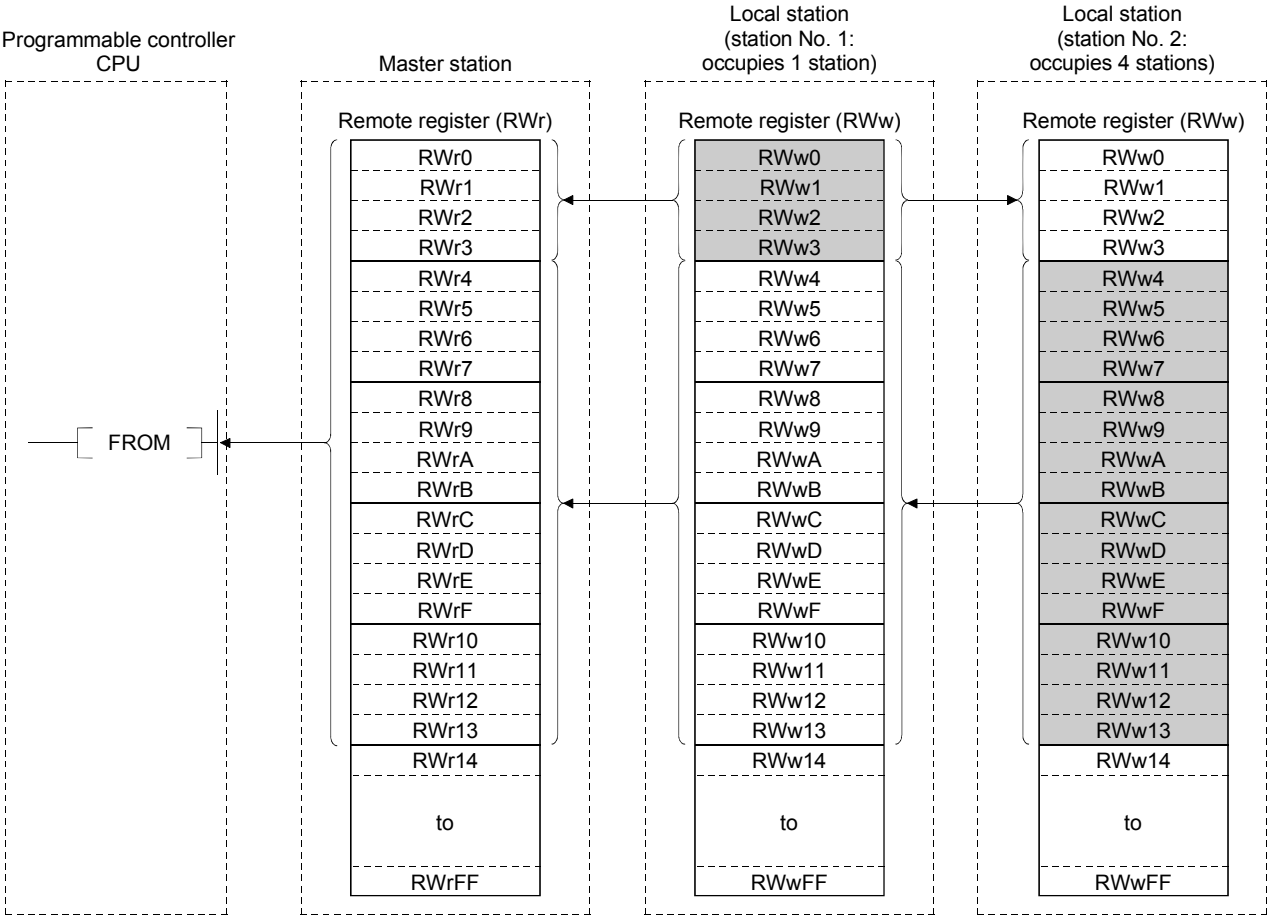
[Word data from the local station → the master station/other local stations]

⑬ With the TO instruction, the word data to be sent to the master station or other local stations is written to the local station's "remote register (RWw)" in the buffer memory.
However, only writing can be performed to the area corresponding to the host station number.

⑭ The data in the "remote register (RWw)" in the buffer memory is automatically (for each link scan) stored in the master station's "remote register (RWr)" and other local station's "remote register (RWw)".

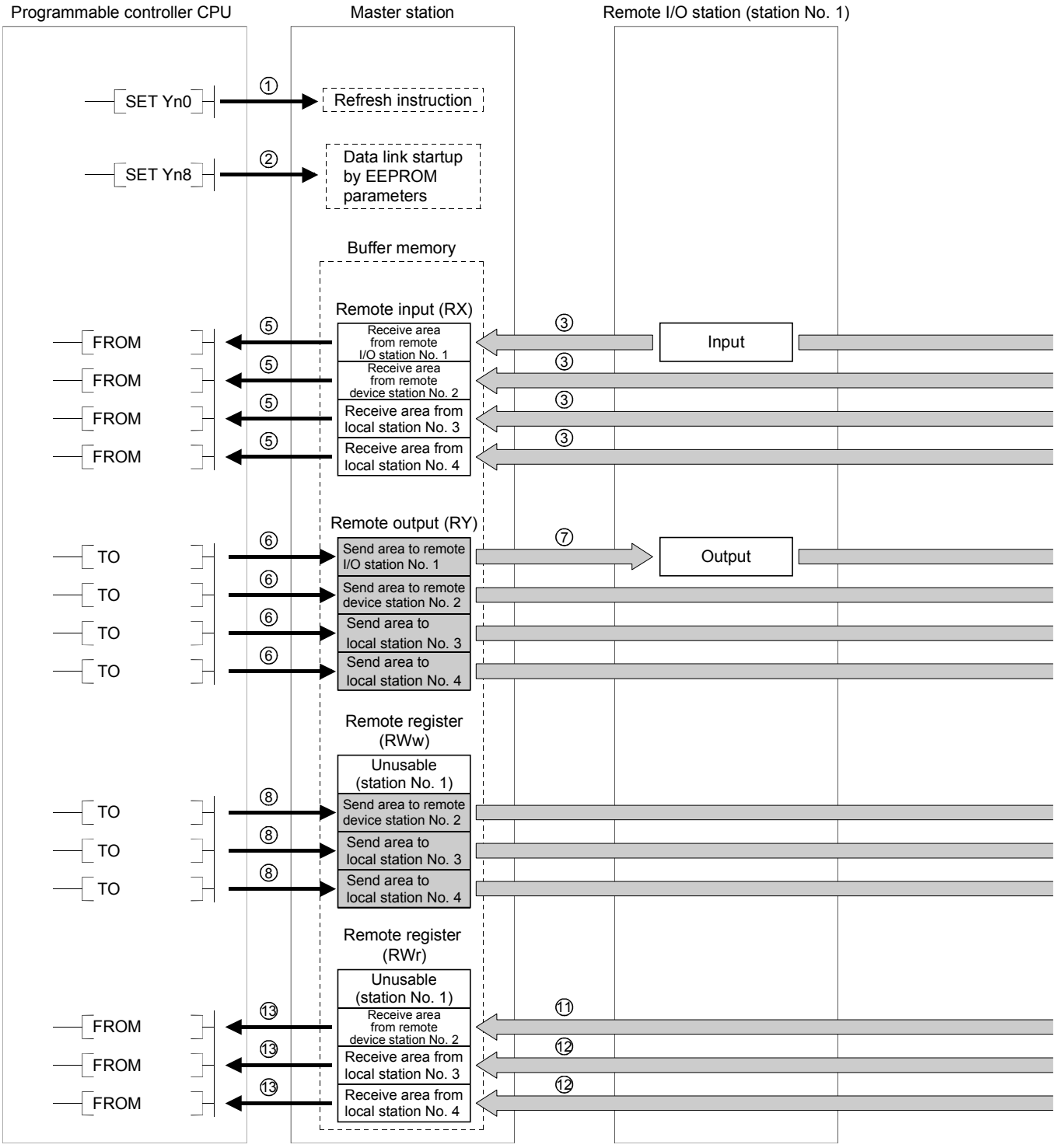
⑮ The word data stored in the "remote register (RWr)" in the buffer memory is received to the programmable controller CPU with the FROM instruction.

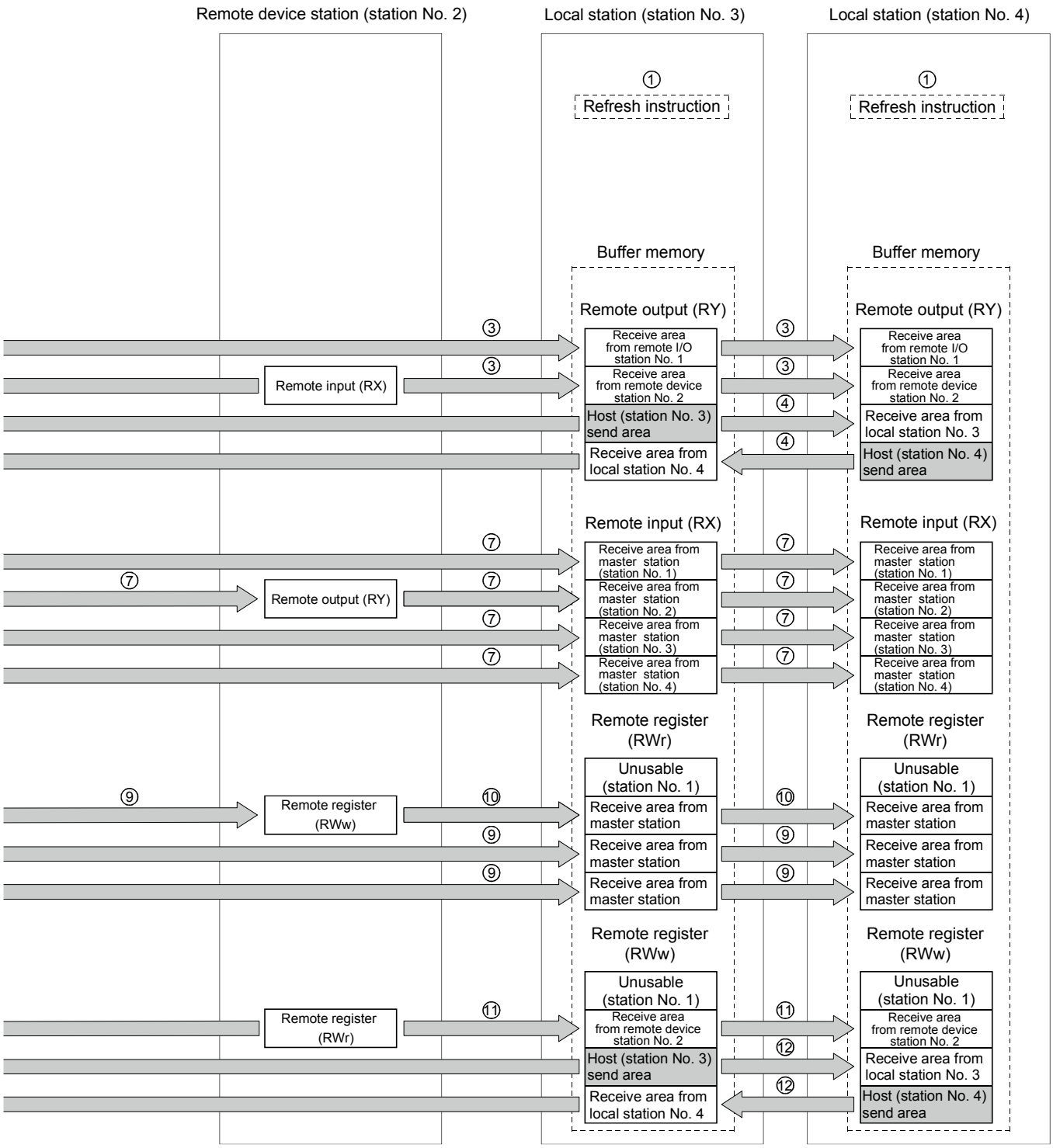
⑯ The word data stored in the "remote register (RWw)" in the buffer memory is received to the programmable controller CPU with the FROM instruction.



4.5 Communication in Compound Systems

The overview of the communication where the remote I/O station, remote device station and local station coexist in the system.




Remote device station (station No. 2)
Local station (station No. 3)
Local station (station No. 4)
①
Refresh instruction
①
Refresh instruction
Buffer memory
Buffer memory
Remote output (RY)
Remote output (RY)
Receive area from remote I/O station No. 1
Receive area from remote device station No. 2
Host (station No. 3) send area
Receive area from local station No. 4
Receive area from remote I/O station No. 1
Receive area from remote device station No. 2
Receive area from local station No. 3
Host (station No. 4) send area
③
④
Remote input (RX)
Remote input (RX)
Receive area from master station (station No. 1)
Receive area from master station (station No. 2)
Receive area from master station (station No. 3)
Receive area from master station (station No. 4)
⑦
Remote output (RY)
Remote register (RWr)
Remote register (RWr)
Unusable (station No. 1)
Receive area from master station
Receive area from master station
Receive area from master station
⑨
⑩
Remote register (RWw)
Remote register (RWw)
Unusable (station No. 1)
Receive area from remote device station No. 2
Host (station No. 3) send area
Receive area from local station No. 4
Unusable (station No. 1)
Receive area from remote device station No. 2
Receive area from local station No. 3
Host (station No. 4) send area
⑪
⑫
Remote register (RWr)

[Data link startup]

① Turn on the refresh instruction (Yn0) and make the remote output (RY) data valid. When the refresh instruction (Yn0) is off, all the remote output (RY) data is treated as 0 (off).

② Turn on the data link startup by the E^2PROM parameters (Yn8) and start the data link.
However, the parameters must be set in the E^2PROM beforehand.
When the data link is started normally, the host data link status (Xn1) turns on.

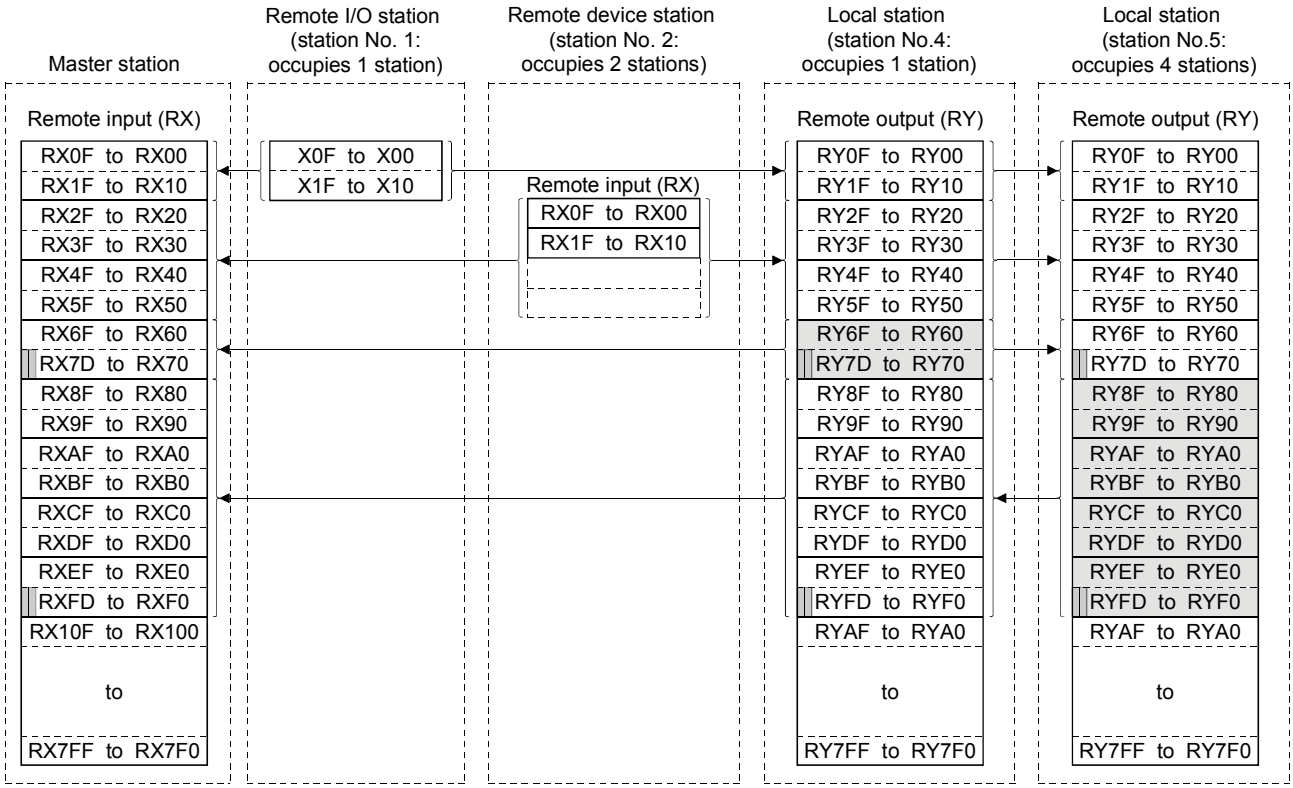
POINT
The data link can also be started from the parameters written in the "parameter data area" in the buffer memory. (Refer to chapter 6.)

[On/off data from remote I/O station/remote device station/local station → the master station]

③ The input of remote I/O station, remote input (RX) of the remote device station and the remote output (RY) of the local station are automatically (for each link scan) stored in the master station's "remote input (RX)" in the buffer memory and local station's "remote output (RY)" in the buffer memory.

④ The data in local station's "remote output (RY)" is also stored in other local station's "remote output (RY)".

⑤ The input status stored in the "remote input (RY)" in the buffer memory is written to the programmable controller CPU with the FROM instruction.

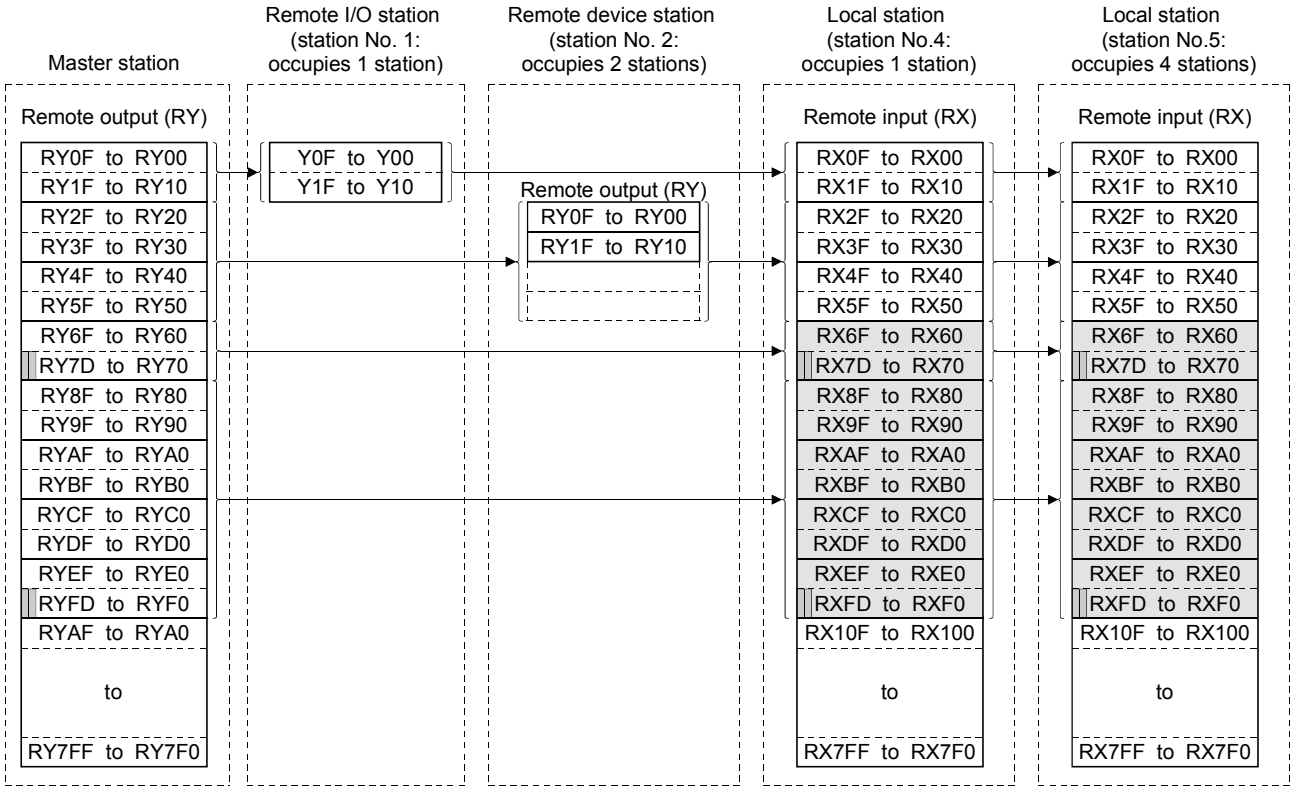


...The last 2 bits cannot be used when the master station and the local station are communicating.

[On/off data from the master station → the remote I/O station/remote device station/ local station]

⑥ With the TO instruction, the on/off data to be sent to the remote I/O station, remote device station and local station is written to the master station's "remote output (RY)" in the buffer memory.

⑦ The output status in the master station's "remote output (RY)" in the buffer memory is automatically (for each link scan) stored in the remote I/O station and remote device station's "remote output (RX)" and local station's remote input (RY).



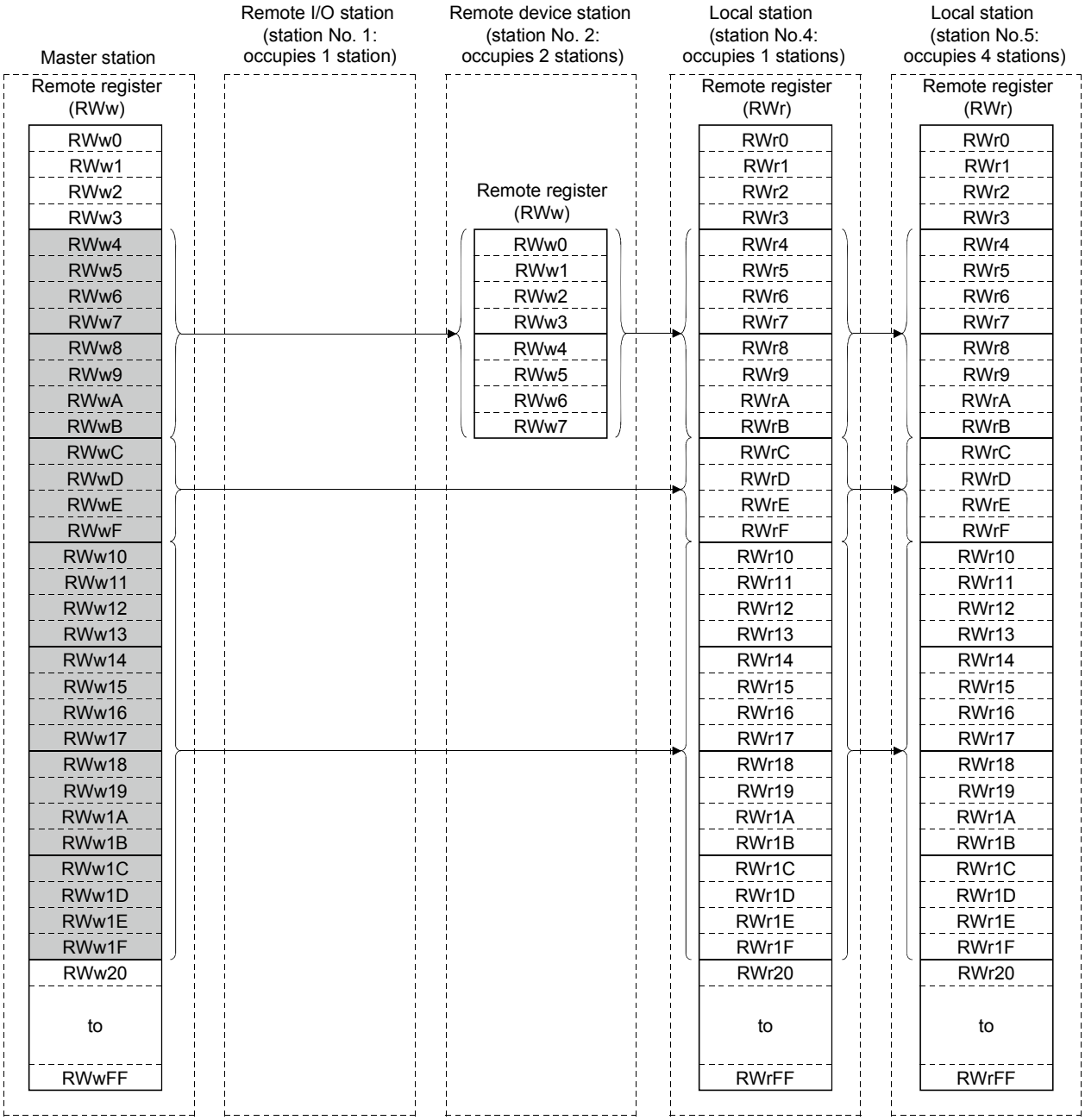
...The last 2 bits cannot be used when the master station and the local station are communicating.

[Word data from the master station → remote device station/all local stations]

ⓐ With the TO instruction, the word data to be sent to remote device station and all local station is written to the master station's "remote register (RWw)" in the buffer memory.

ⓑ The data in the "remote register (RWw)" in the buffer memory is automatically (for each link scan) stored to remote device station's remote register (RWw) and all local stations' remote registers (RWr).

ⓒ The transmission data to the remote device station's remote register (RWw) is also sent to the local stations.



[Word data from the master station → remote device station/all local stations]

ⓐ With the TO instruction, the word data to be sent to remote device station and all local station is written to the master station's "remote register (RWw)" in the buffer memory.

ⓑ The data in the "remote register (RWw)" in the buffer memory is automatically (for each link scan) stored to remote device station's remote register (RWw) and all local stations' remote registers (RWr).

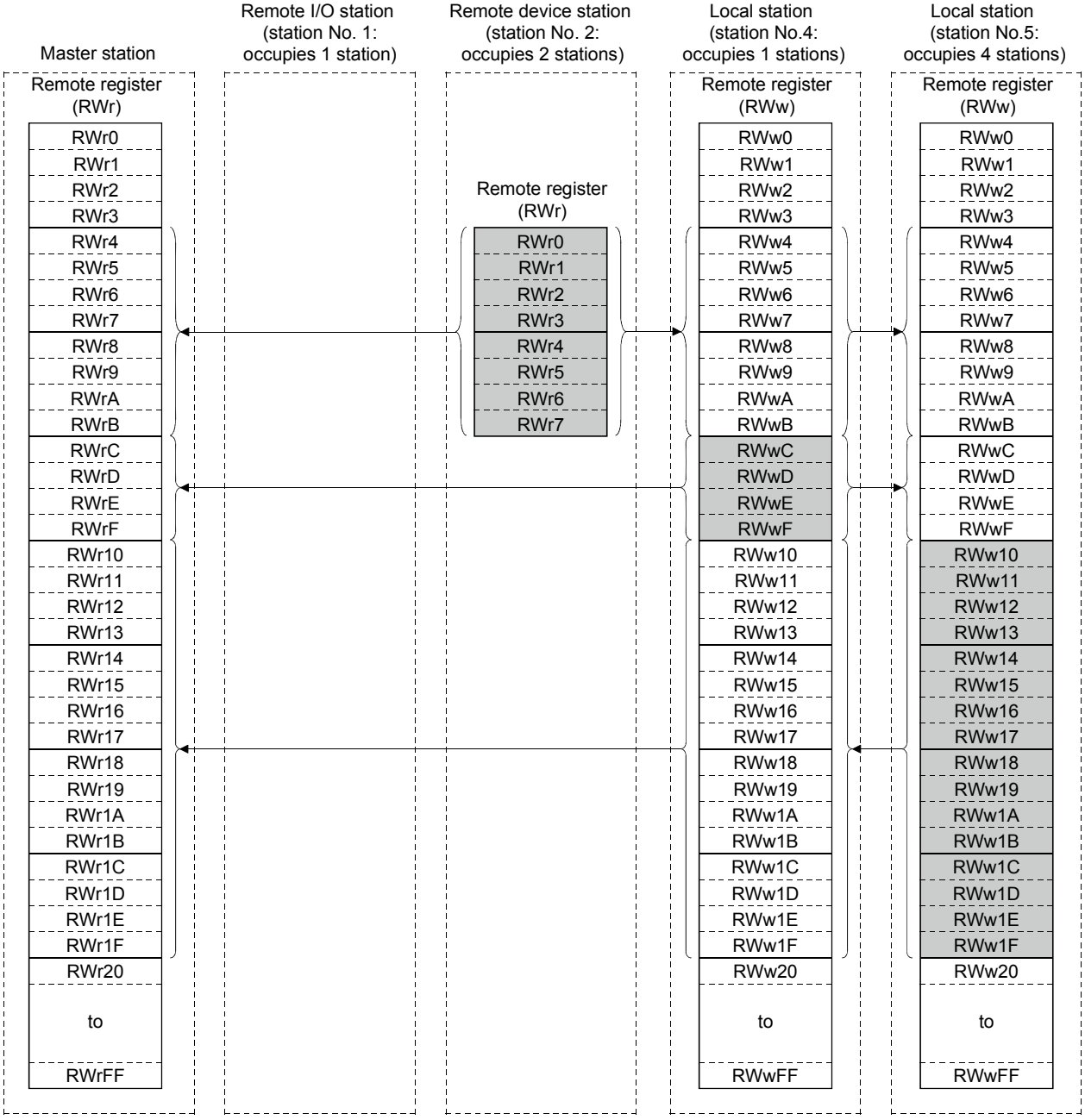
ⓒ The transmission data to the remote device station's remote register (RWw) is also sent to the local stations.

[Word data from the remote device station/local station → the master station]

⑪ The data in the remote device station's remote register (RWr) is automatically (for each link scan) stored in the master station's remote register (RWr) and all local stations' remote registers (RWw).

⑫ The data in the local station's "remote register (RWw)" in the buffer memory is automatically (for each link scan) stored in the master station's remote register (RWr) and other local station's remote register (RWr).

⑬ The data of the remote device and local stations stored in the "remote register (RWr)" in the buffer memory is written to the programmable controller CPU with the FROM instruction.



4.6 Reserved Station Function

This is a function to treat the remote and local stations that are not actually connected (but planned for connection in the future) not as "data-link faulty stations".

POINT
If already connected remote and local stations are set as reserved station, the specified remote and local stations cannot perform data link at all.

(1) Setting method

The reserved station specification is performed with parameters (buffer memory address 10H to 13H).

Turn on the bit corresponding to the station number of the station to be reserved. However, for remote/local stations that occupy more than 2 stations, turn on the only bit corresponding to the station number set in the module's station number setting switch.

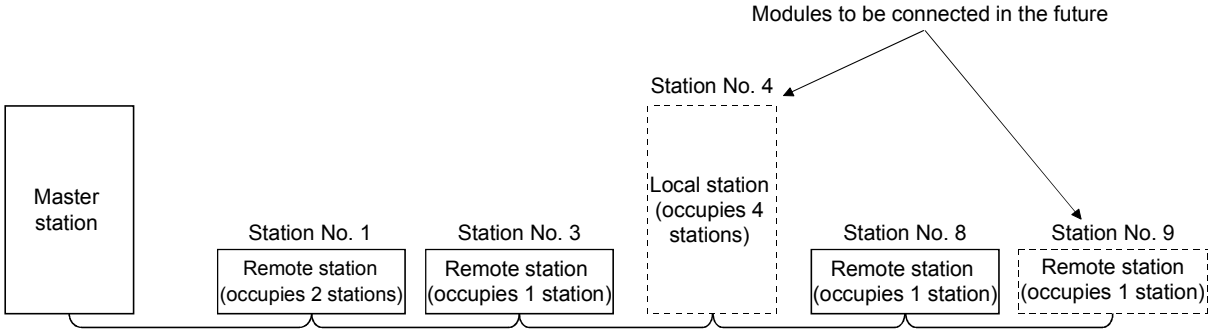
The buffer memory configuration is shown below. (1 to 64 indicates station numbers.)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
10H	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
11H	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
12H	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
13H	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

(2) Setting example

(a) System configuration example

When one local station and one remote station are to be connected in the future to the system with three remote stations:



(b) Buffer memory setting example

Turn on the 3rd bit, corresponding to station No. 4, and 8th bit, corresponding to station No. 9. (Set "264" for address 10H.)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
10H	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
11H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4.7 Error Invalid Station Function

This is a function to treat the remote and local stations that cannot perform data links due to power off, etc. not as "data-link faulty stations" on the master station and the local station.
Be careful, however, for errors will not be detected at all if set so.

POINT
If the remote or local station set as the invalid station and also "specified as a reserved station", the reserved station function has priority.

(1) Setting method

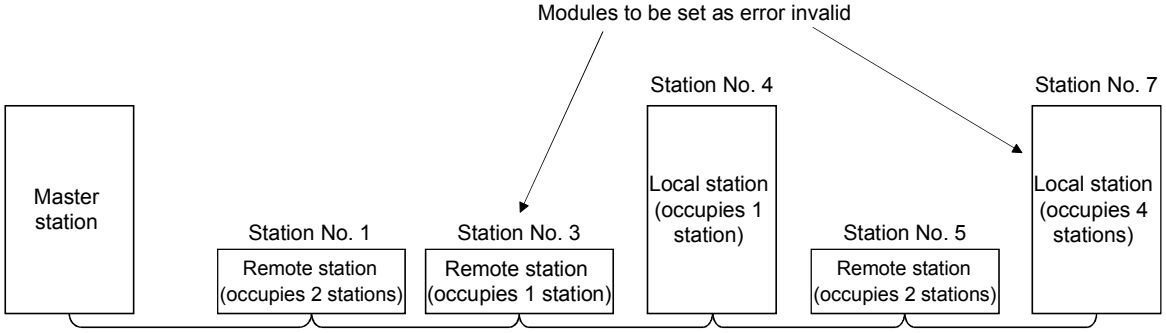
The invalid station specification is performed with parameters (buffer memory address 14H to 17H).
Turn on the bit corresponding to the station number to be set as invalid.
However, for the remote/local station which occupies more than 2 stations, turn on the only bit corresponding to the station number set with the module's station number setting switch.
The buffer memory configuration is shown below. (1 to 64 indicates station numbers.)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
14H	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
15H	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
16H	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
17H	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

(2) Setting example

(a) System configuration example

When specifying the remote station No.3 and local station No.7 as invalid stations in a system where three remote and two local stations are connected:



(b) Buffer memory setting example

Turn on the 2nd bit, corresponding to station No. 3, and 6th bit, corresponding to station No. 7. (Set "68" for address 14H.)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
14H	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
15H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4.8 Data Link Status Setting When the Master Station Programmable Controller CPU Has an Error

The data link status for when the master station's programmable controller CPU has an "operation-stop error" can be set.
The data link between local stations can be continued.

POINT
Even if the master station programmable controller CPU has an "operation-stop error", the data link continues.

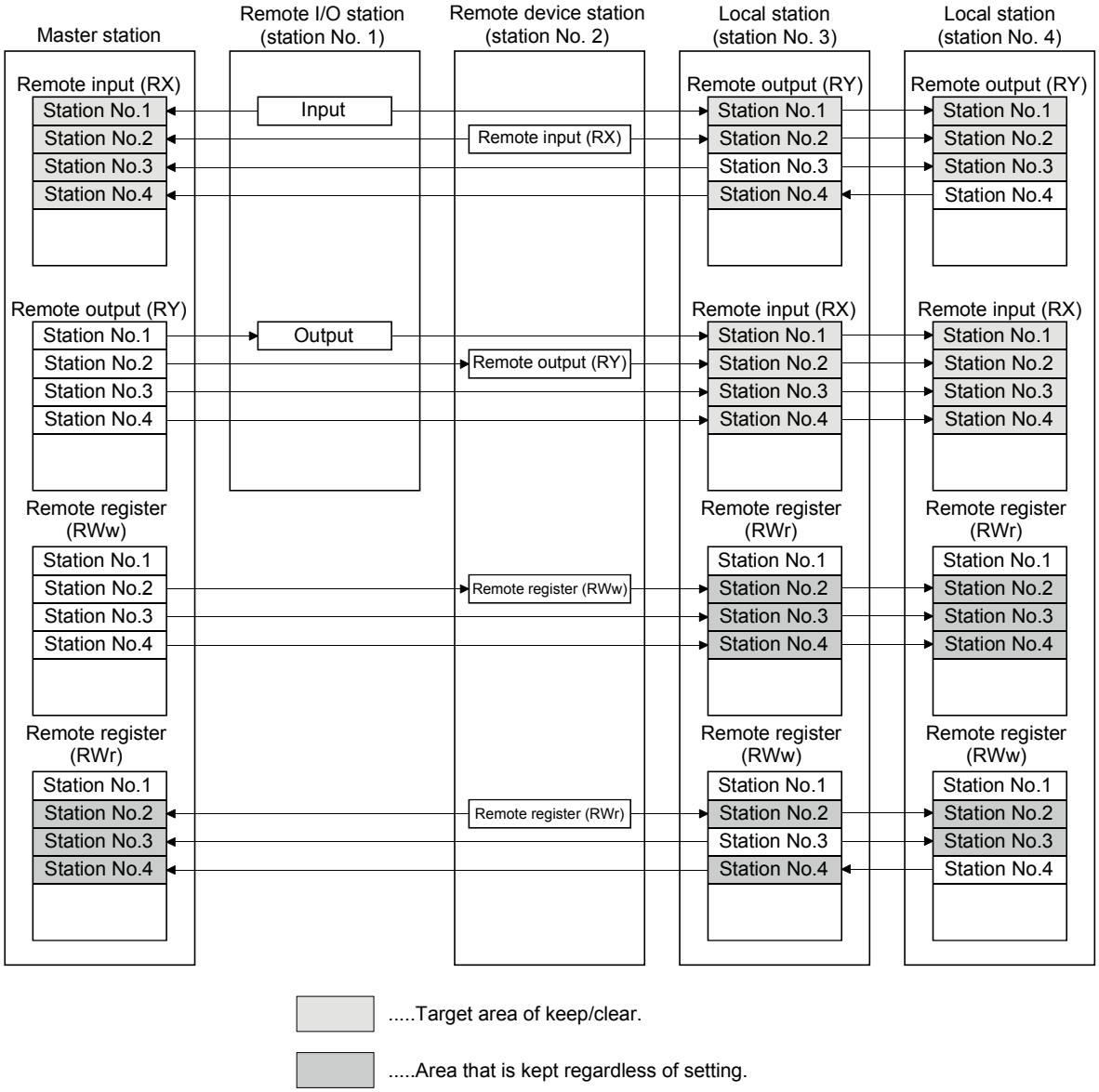
[Setting method]
Set to the "operation specification when the CPU is down (address 6H)" in the parameter information area of the master station's buffer memory
0.....Stop (default)
1.....Continue

4.9 Setting the Status of Input Data from a Data Link Faulty Station

The input (received) data status from a data-link faulty station can be set.

(1) Target input (received) data

The target buffer-memory area is shown below:



.....Target area of keep/clear.

.....Area that is kept regardless of setting.

(2) Setting method

This is set with the master/local module's "condition setting switch (DIP switch) SW4".

OFF .....Clear (setting at shipment)

ON .....Keep the status right before error

POINT
When the data-link fauly station is set as an error-invalid station, the input data from that station (remote input RX, remote output RY) are kept, regardless of the SW4 setting.

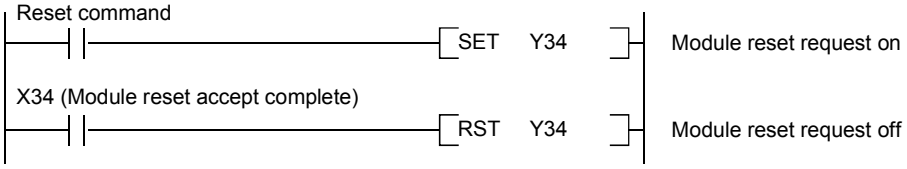
4.10 Module Reset Function from a Sequence Program

When the switch setting is changed or an error occurs with the module, the module can be reset from the sequence program instead of resetting the programmable controller CPU.
However, reset cannot be performed when there is module error (Xn0 is on).

POINT

Because the programmable controller CPU is not reset, other modules will not be affected at all.

A program example for resetting is shown below.
This example assumes that the module's first I/O No. is X/Y30.



REMARK

The following changes cannot be performed by the module reset request (Yn4). Turn the power off then on, or reset the programmable controller CPU.
1) Station No. 0 (master station) → change to station No. 1 to 64 (local station)
2) Station No. 1 to 64 (local station) → change to station No. 0 (master station)
3) Mode 0 or 2 → change to test mode

4.11 Data Link Stop/Restart

The data link in the host station can be stopped or restarted.
When the data link is stopped for the master station, the data link for the entire system stops.

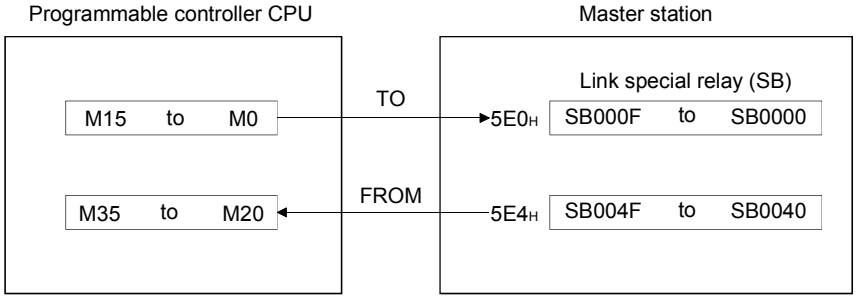
(1) The link special relay used in the program is shown below:

SB0000: Data link restart request
SB0002: Data link stop request
SB0041: Data link restart complete
SB0045: Data link stop complete

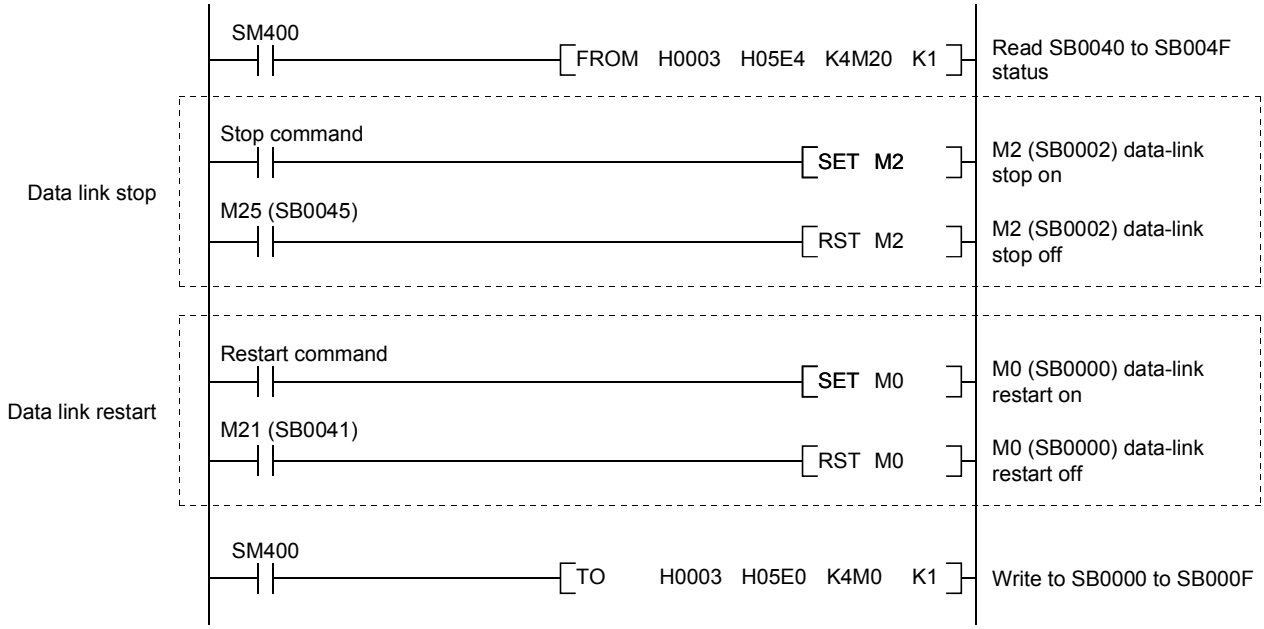
(2) A program example to stop/restart the data link is shown below.

This example assumes that the module's first I/O No. is X/Y30.

① Relationship between the programmable controller CPU and master station



② Program example



POINT
SB0000 must be used to start a data link if it has been stopped with SB0002.

4.12 RAS Function

RAS is an abbreviation for Reliability, Availability and Serviceability. This refers to the total ease of use in an automated facility.

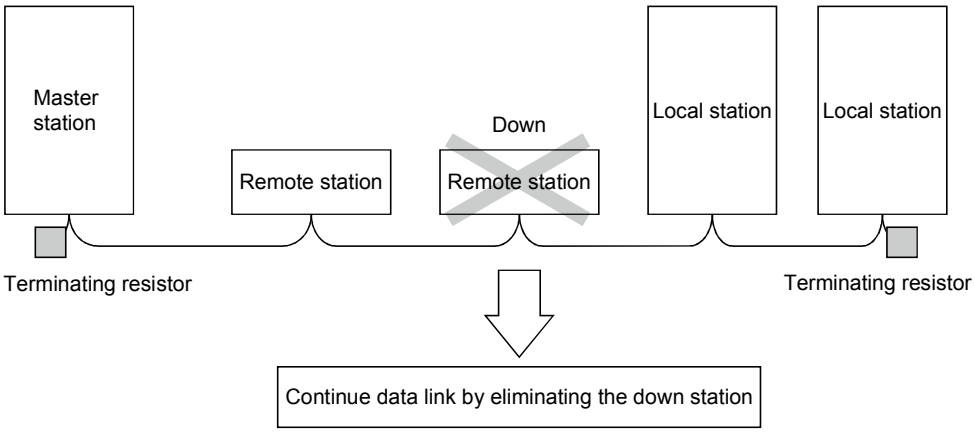
4.12.1 Automatic return function

This function allows the remote and local station disconnected from the data link due to power off, etc. to be recovered to the data link automatically when the module returns to normal operation.
When using the automatic return function, set the mode setting switch to "0" or "1".

Mode setting switch	Setting details	Remark
0	Online (remote net mode)	–
1	Online (remote I/O net mode)	–
2	Offline	Data link not possible (disconnected)

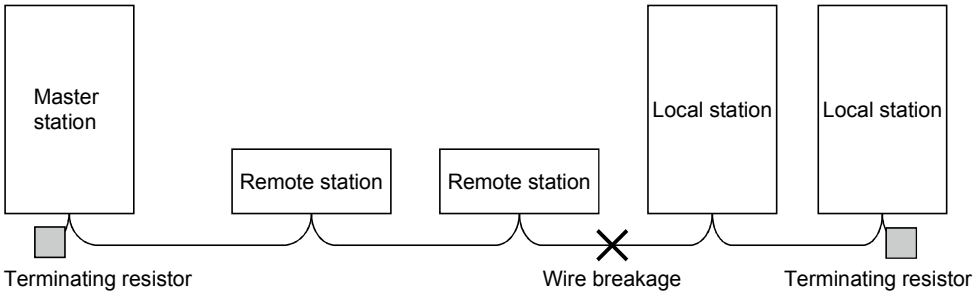
4.12.2 Slave station cut-off function

This function allows data link to continue with the normal remote and local stations by cutting off the remote and local stations which cannot perform data links due to power off, etc.



POINT

When the cable is disconnected, the data link cannot be performed because the terminating resistor is missing.

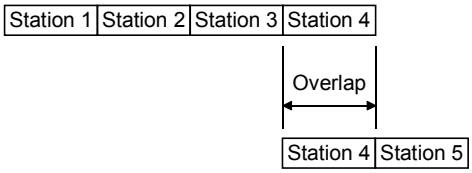


4.12.3 Station number overlap checking function

Checks whether the number of occupied stations overlap, by observing the status of the stations actually connected during data link startup (turn on Yn6 and Yn8).

(Example)

Local station (station number 1, occupied stations: 4)

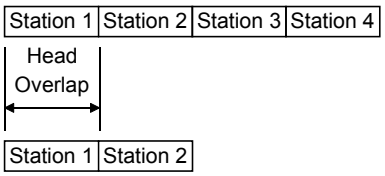


Remote device station (station number 4, occupied stations: 2)

However, if the starting head number overlaps, this would not be a part of the overlap checking.

(Example)

Local station (station number 1, occupied stations: 4)



Remote device station (station number 1, occupied stations: 2)

(1) When there is an overlap, the "M/S" LED flashes, and the overlap status is stored in SW0098 to SW009B.

(2) Even if overlap exists, data link can be continued with other normally functioning stations.

(3) By correcting the switch setting to the normal status and starting up the data link (turn on Yn6 and Yn8) again, the "M/S" LED is turned off and the data in SW0098 to SW009B are cleared.

5. DATA LINK PROCESSING TIME

5.1 Status of Each Station When an Error Has Occurred

The status of each station when an error has occurred is shown in the table below.

Data link status				Master station				Remote I/O station	
				Remote input (RX)	Remote output (RY)	Remote register (RWw)	Remote register (RWr)	Input	Output
When the master station's programmable controller CPU is stopped (data link continue)				Continue	All "0" ∗1	Continue	Continue	Continue	All points OFF
When the local station's programmable controller CPU is stopped (data link continue)				All points off only in the receive area from the stopped local station ∗1	Continue	Continue	Continue	Continue	Continue
When data link is stopped in the entire system	Input-data status setting of faulty station (SW4)	Master station	Clear	Clear	–	–	Keep	–	All points OFF
			Keep	Keep					
		Local station	Clear						
			Keep						
When a communication error (power off, etc.) occurred in a remote I/O station	Input-data status setting of faulty station (SW4)	Master station	Clear	Clear the receive area from the remote I/O station with a communication error.	Continue	Continue	Continue	–	All points OFF
			Keep	Keep the receive area from the remote I/O station with a communication error.					
		Local station	Clear						
			Keep						
When a communication error (power off, etc.) occurred in a remote device station	Input-data status setting of faulty station (SW4)	Master station	Clear	Clear the receive area from the remote device station with a communication error.	Continue	Continue	Keep the receive area from the remote device station with a communication error.	Continue	Continue
			Keep	Keep the receive area from the remote device station with a communication error.					
		Local station	Clear						
			Keep						
When a communication error (power off, etc.) occurred in a local station	Input-data status setting of faulty station (SW4)	Master station	Clear	Clear the receive area from the local station with a communication error.	Continue	Continue	Keep the receive area from the local station with a communication error.	Continue	Continue
			Keep	Keep the receive area from the local station with a communication error.					
		Local station	Clear						
			Keep						

∗1 : Because Yn0 (refresh instruct) is turned OFF.

<table>
<tr><th colspan="5" rowspan="2">Data link status</th><th colspan="4">Remote device station</th><th colspan="4">Local station/standby master station/ intelligent device station</th></tr>
<tr><th>Remote input (RX)</th><th>Remote output (RY)</th><th>Remote register (RWw)</th><th>Remote register (RWr)</th><th>Remote input (RX)</th><th>Remote output (RY)</th><th>Remote register (RWw)</th><th>Remote register (RWr)</th></tr>
<tr><td colspan="5">When the master station's programmable controller CPU is stopped (data link continue)</td><td>Continue</td><td>All points OFF</td><td>Continue</td><td>Continue</td><td>All points OFF</td><td>Continue</td><td>Continue</td><td>Continue</td></tr>
<tr><td colspan="5">When the local station's programmable controller CPU is stopped (data link continue)</td><td>Continue</td><td>Continue</td><td>Continue</td><td>Continue</td><td>Continue</td><td>Treat the host transmission area as all "0" ∗1.
All points off only in the receive area from stopped local station</td><td>Continue</td><td>Continue</td></tr>
<tr><td rowspan="3">When data link is stopped in the entire system</td><td rowspan="3">Input-data status setting of faulty station (SW4)</td><td>Master station</td><td>Clear</td><td rowspan="3">–</td><td rowspan="3">All points OFF</td><td rowspan="3">–</td><td rowspan="3">–</td><td colspan="4"></td></tr>
<tr><td>Master station</td><td>Keep</td></tr>
<tr><td>Local station</td><td>Clear</td><td>Clear</td><td>Clear the receive area from the other station.</td><td rowspan="2">Keep the receive area from the other station.</td><td rowspan="2">Keep</td></tr>
<tr><td>Local station</td><td>Keep</td><td>Keep</td><td>Keep the receive area from the other station.</td></tr>
<tr><td rowspan="4">When a communication error (power off, etc.) occurred in a remote I/O station</td><td rowspan="6">Input-data status setting of faulty station (SW4)</td><td>Master station</td><td>Clear</td><td rowspan="4">Continue</td><td rowspan="4">Continue</td><td rowspan="4">Continue</td><td rowspan="4">Continue</td><td colspan="4"></td></tr>
<tr><td>Master station</td><td>Keep</td></tr>
<tr><td rowspan="2">Local station</td><td>Clear</td><td rowspan="2">Continue</td><td>Clear the receive area from the remote I/O station with a communication error.</td><td rowspan="2">Continue</td><td rowspan="2">Continue</td></tr>
<tr><td>Keep</td><td>Keep the receive area from the remote I/O station with a communication error.</td></tr>
<tr><td rowspan="4">When a communication error (power off, etc.) occurred in a remote device station</td><td>Master station</td><td>Clear</td><td rowspan="4">–</td><td rowspan="4">–</td><td rowspan="4">–</td><td rowspan="4">–</td><td colspan="4"></td></tr>
<tr><td>Master station</td><td>Keep</td></tr>
<tr><td rowspan="2">Local station</td><td>Clear</td><td rowspan="2">Continue</td><td>Clear the receive area from the remote device station with a communication error.</td><td rowspan="2">Keep the receive area from the remote device station with a communication error.</td><td rowspan="2">Continue</td></tr>
<tr><td>Keep</td><td>Keep the receive area from the remote device station with a communication error.</td></tr>
</table>

∗1 : Because Yn0 (refresh instruct) is turned OFF.

<table>
<tr><th colspan="4" rowspan="2">Data link status</th><th colspan="4">Remote device station</th><th colspan="4">Local station, standby master station, intelligent device station</th></tr>
<tr><th>Remote input (RX)</th><th>Remote output (RY)</th><th>Remote register (RWw)</th><th>Remote register (RWr)</th><th>Remote input (RX)</th><th>Remote output (RY)</th><th>Remote register (RWw)</th><th>Remote register (RWr)</th></tr>
<tr><td rowspan="3">When a communication error (power off, etc.) occurred in a local station</td><td rowspan="3">Input-data status setting of faulty station (SW4)</td><td>Master station</td><td>Clear</td><td rowspan="3">Continue</td><td rowspan="3">Continue</td><td rowspan="3">Continue</td><td rowspan="3">Continue</td><td colspan="4"></td></tr>
<tr><td>Keep</td></tr>
<tr><td rowspan="2">Local station</td><td>Clear</td><td rowspan="2">Continue</td><td>Clear the receive area from the local station with a communication error.</td><td rowspan="2">Keep the receive area from the local station with a communication error.</td><td rowspan="2">Continue</td></tr>
<tr><td>Keep</td><td>Keep the receive area from the local station with a communication error.</td></tr>
</table>

5.2 Link Scan Time

The link scan time of CC-Link is calculated as follows using:

[Link scan time (LS)]

LS = BT {29.4 + (NI × 4.8) + (NW × 9.6) + (N × 32.4) + (ni × 4.8) + (nw × 9.6)} + ST
+ {Number of communication faulty stations × 48 × BT × Number of retries}∗ [µs]

BT: Constant (Transmission speed)

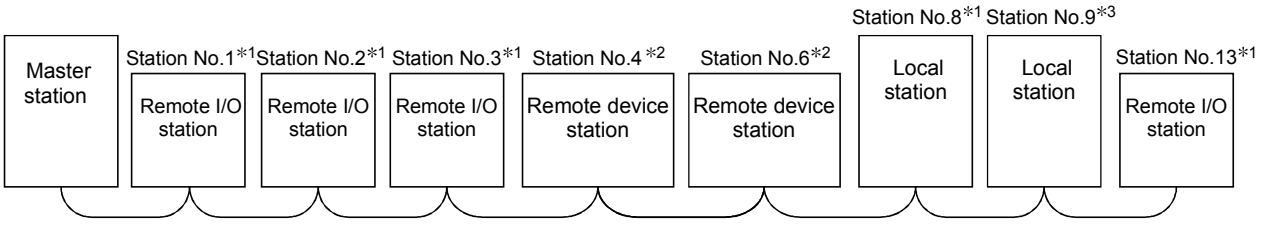
Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
BT	51.2	12.8	3.2	1.6	0.8

NI : Last station number in a, b, and c (including number of occupied stations and excluding number of reserved stations)
NW : Last station in b and c (Including number of occupied stations and excluding number of reserved stations)
} It should be the multiple of 8.

Last station number	1 to 8	9 to 16	17 to 24	25 to 32	33 to 40	41 to 48	49 to 56	57 to 64
NI, NW	8	16	24	32	40	48	56	64

N : Number of connected stations (excluding the number of reserved stations)
ni : a + b + c (excluding the number of reserved stations)
nw : b + c (excluding reserved stations)
ST : Constant (It should be the largest value in items ① to ③ below. When b = 0, ignore item ② and, when c = 0, ignore item ③.)
① 800 + (a × 15)
② 900 + (b × 50)
③ When c ≤ 26: 1200 + (c × 100)
When c > 26: 3700 + {(c - 26) × 25}
a : Total number of occupied stations for remote I/O stations
b : Total number of occupied stations for remote device stations
c : Total number of occupied stations for intelligent device stations (including local stations)
∗ : Only when there exist stations with faulty communication (including error invalid stations and temporary error invalid stations)

(Example) When the transmission speed is at 2.5 Mbps in the following system configuration:



∗1: 1 station occupied ∗2: 2 stations occupied ∗3: 4 stations occupied

BT = 3.2 ST = 1700
NI = 13 → 16 ① 800 + (4 × 15) = 860
NW = 12 → 16 ② 900 + (4 × 50) = 1100
N = 8 ③ 1200 + (5 × 100) = 1700
ni = 13 a=4 b=4 c=5
nw = 9

LS = 3.2 {29.4 + (16 × 4.8) + (16 × 9.6) + (8 × 32.4) + (13 × 4.8) + (9 × 9.6)} + 1700
= 3836.96 [µs]
= 3.84 [ms]

5.3 Transmission Delay Time

Indicates transmission delay time (time required for data transmission).

5.3.1 Master station ↔ remote I/O station

(1) Master station (RX) ← remote I/O station (input)

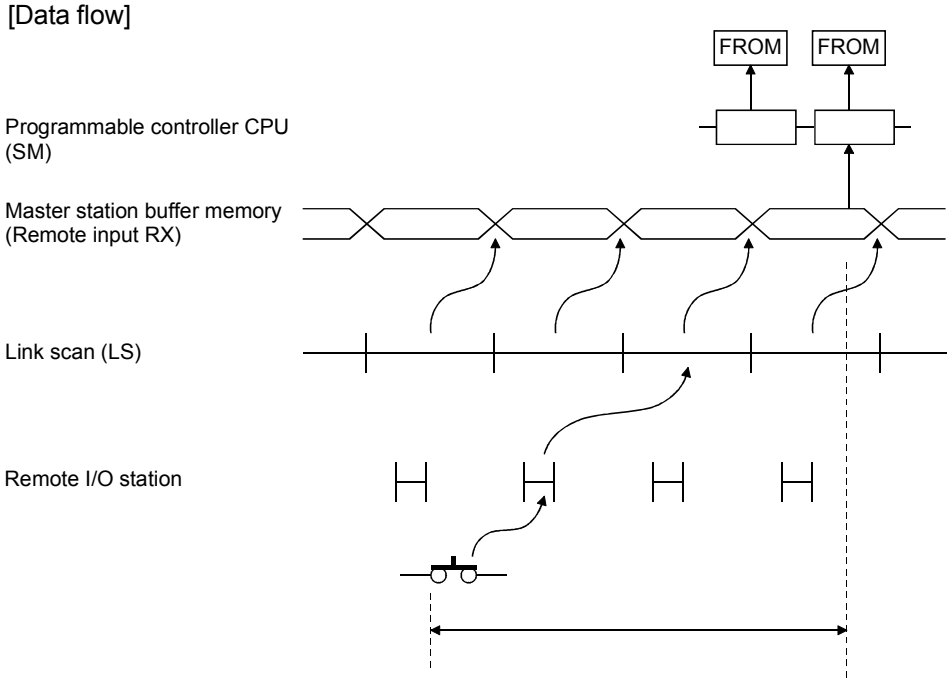
[Expression]

SM + LS × 3 + Remote I/O station response time [ms]

SM: Scan time of the master station's sequence program

LS : Link scan time (See Section 5.2.)

[Data flow]



(2) Master station (RY) → remote I/O station (output)

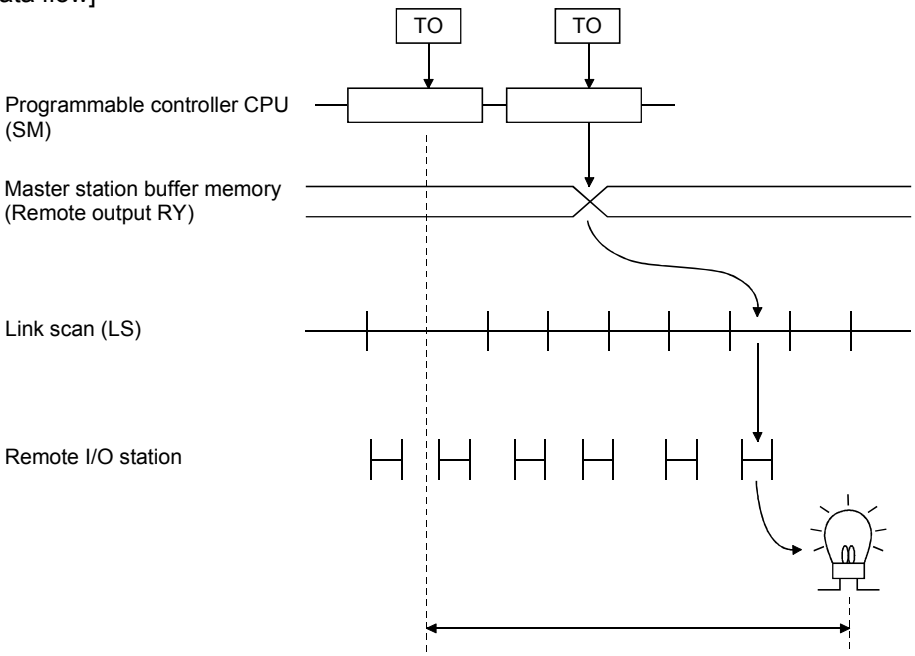
[Expression]

SM + LS × 3 + Remote I/O station response time [ms]

SM: Scan time of the master station's sequence program

LS : Link scan time (See Section 5.2.)

[Data flow]



5.3.2 Master station ↔ remote device station

(1) Master station (RX) ← remote device station (RX)

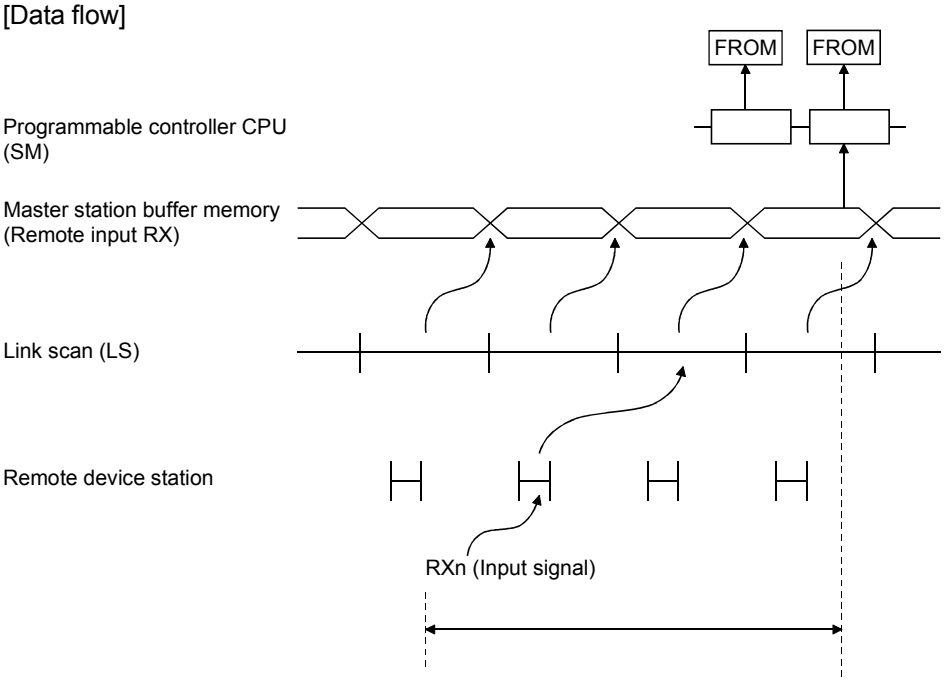
[Expression]

SM + LS × 2 + Remote device station process time [ms]

SM: Scan time of the master station's sequence program

LS : Link scan time (See Section 5.2.)

[Data flow]



(2) Master station (RY) → remote device station (RY)

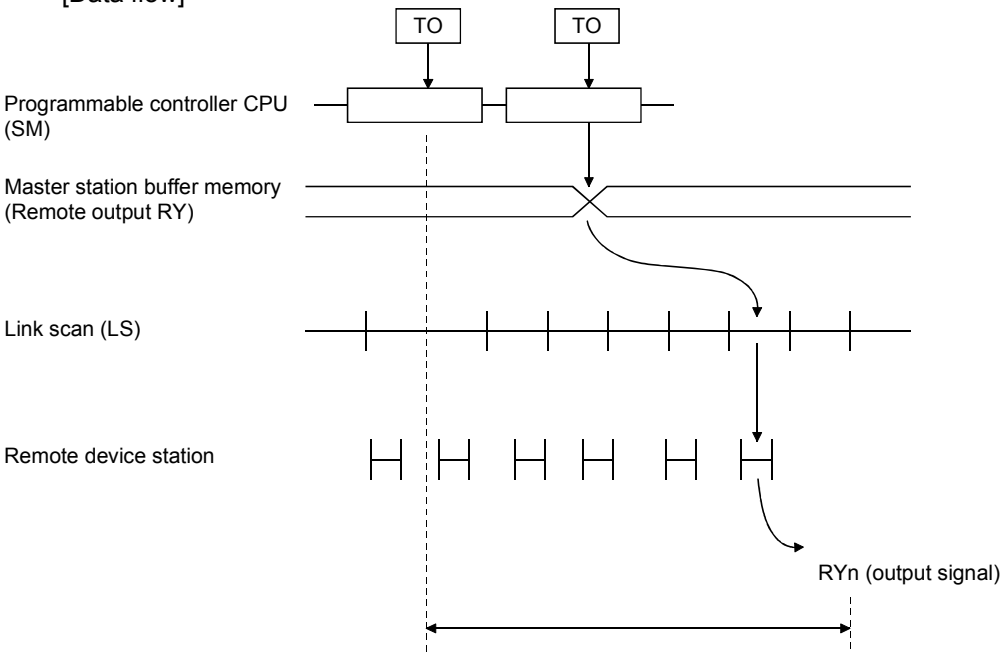
[Expression]

SM + LS × 3 + Remote device station process time [ms]

SM: Scan time of the master station's sequence program

LS : Link scan time (See Section 5.2.)

[Data flow]



(3) Master station (RWw) → remote device station (RWw)

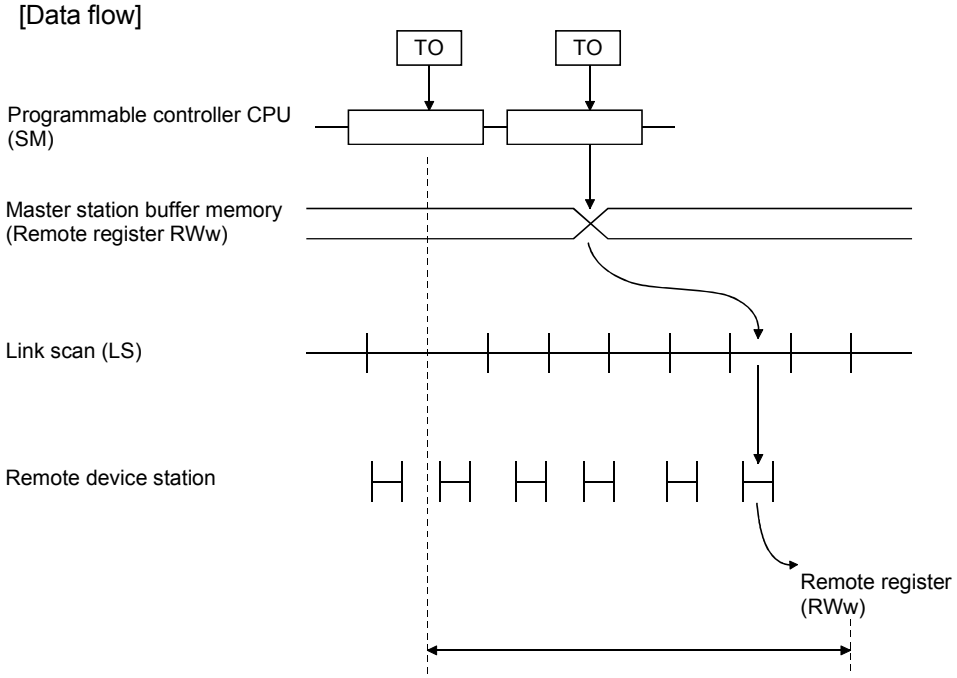
[Expression]

SM + LS × 3 + Remote device station process time [ms]

SM: Scan time of the master station's sequence program

LS : Link scan time (See Section 5.2.)

[Data flow]



(4) Master station (RWr) ← remote device station (RWr)

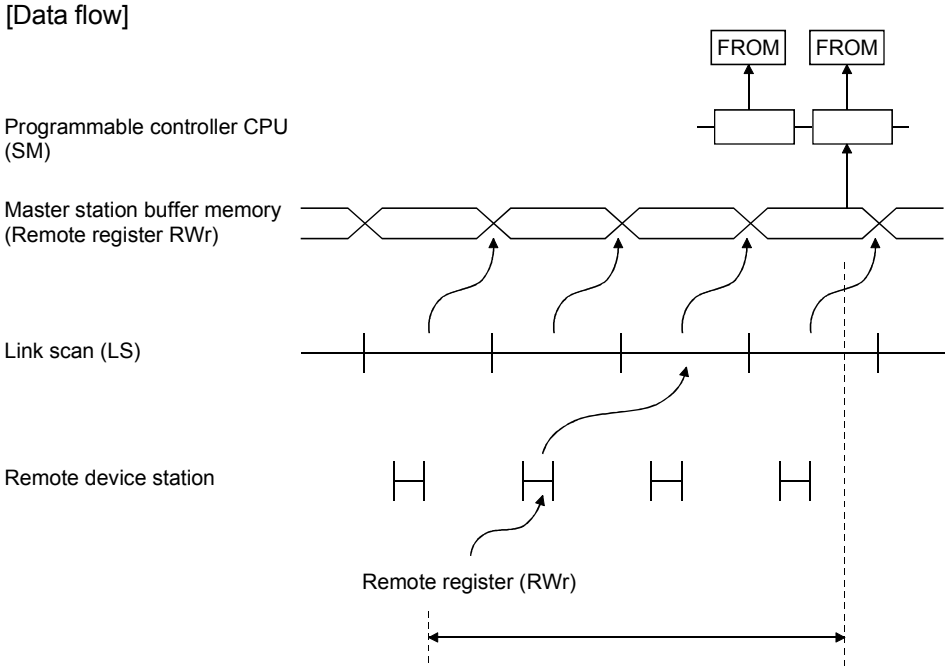
[Expression]

SM + LS × 2 + Remote device station process time [ms]

SM: Scan time of the master station's sequence program

LS : Link scan time (See Section 5.2.)

[Data flow]



5.3.3 Master station ↔ local station

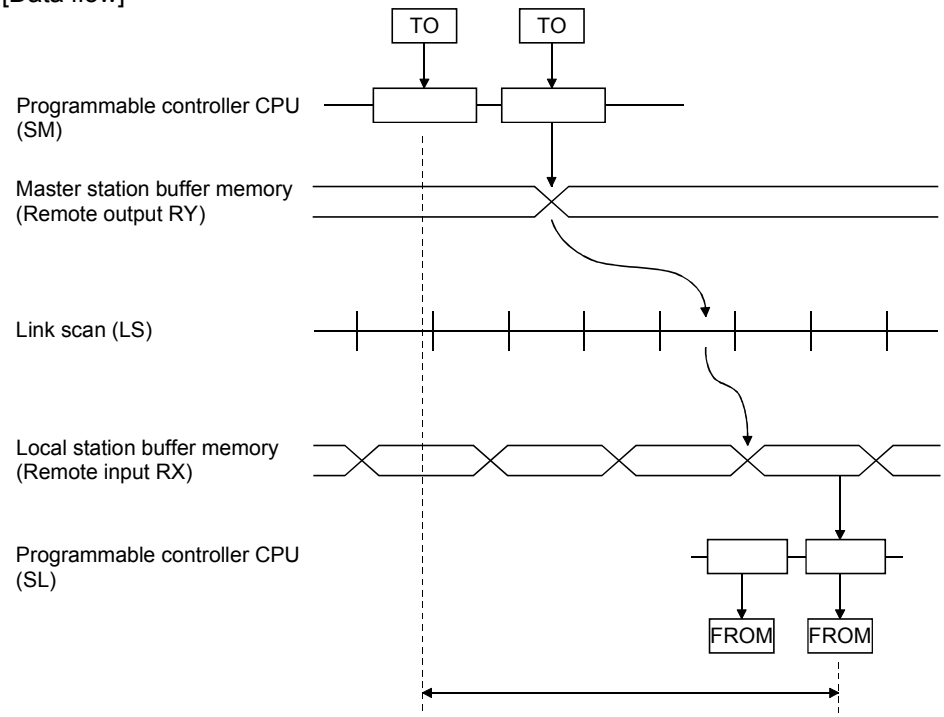
(1) Master station (RY) → local station (RX)

[Expression]

SM + LS × 3 + SL [ms]

SM : Scan time of the master station's sequence program
LS : Link scan time (See Section 5.2.)
SL : Scan time of the local station's sequence program

[Data flow]



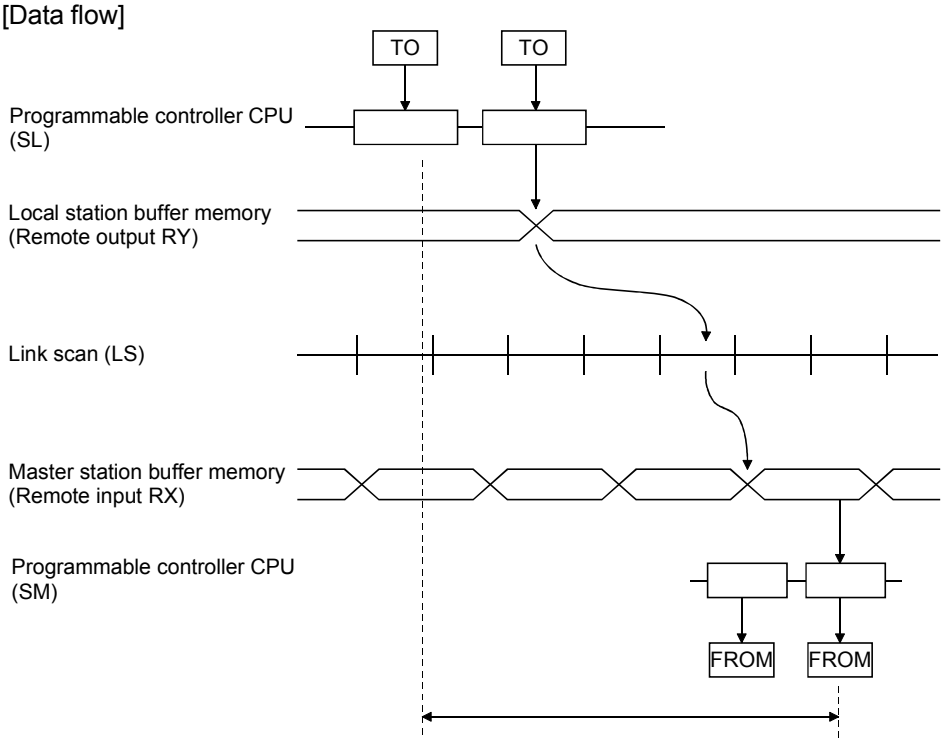
(2) Master station (RX) ← local station (RY)

[Expression]

SM + LS × 3 + SL [ms]

SM : Scan time of the master station's sequence program
LS : Link scan time (See Section 5.2.)
SL : Scan time of the local station's sequence program

[Data flow]



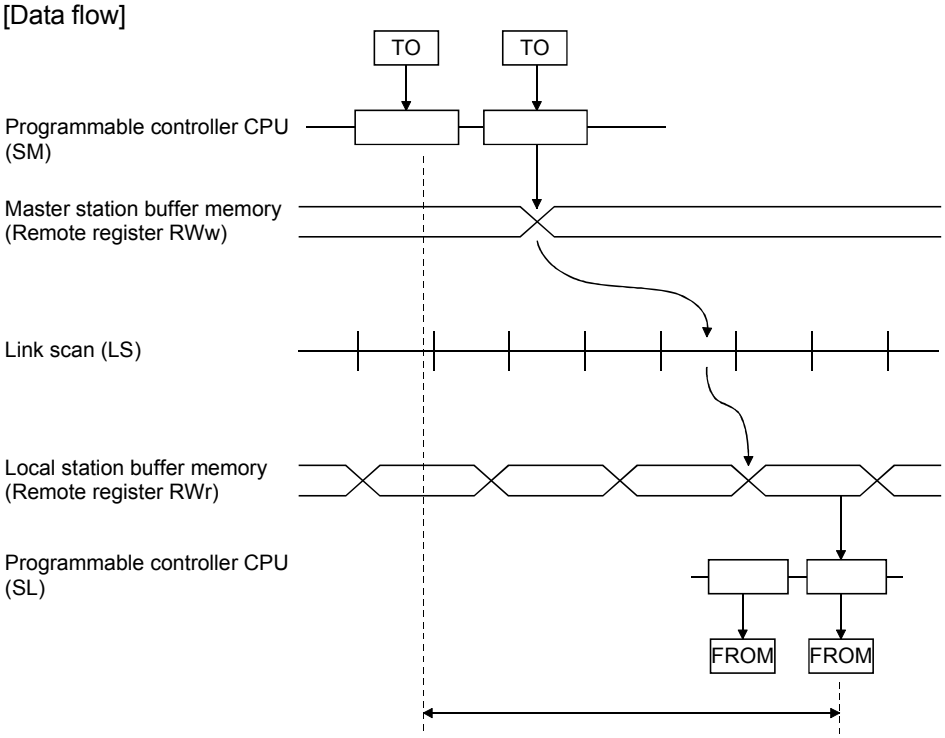
(3) Master station (RWw) → local station (RWr)

[Expression]

SM + LS × 3 + SL [ms]

SM : Scan time of the master station's sequence program
LS : Link scan time (See Section 5.2.)
SL : Scan time of the local station's sequence program

[Data flow]



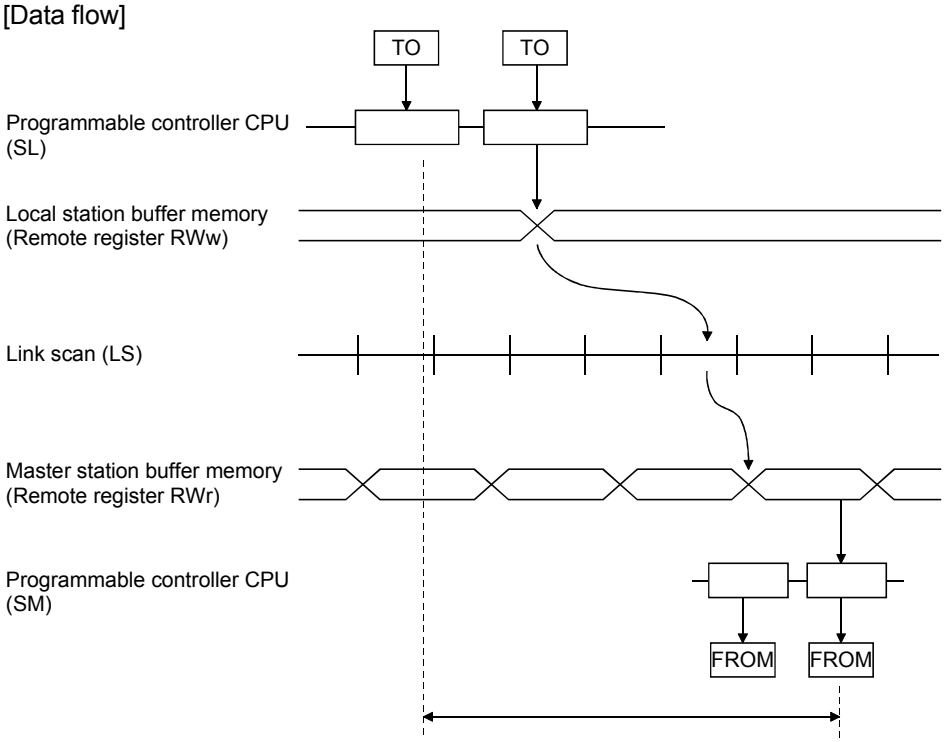
(4) Master station (RWr) ← local station (RWw)

[Expression]

SM + LS × 3 + SL [ms]

SM : Scan time of the master station's sequence program
LS : Link scan time (See Section 5.2.)
SL : Scan time of the local station's sequence program

[Data flow]



5.3.4 Master station ↔ intelligent device station

The transmission delay time between the master station and intelligent device station varies depending on the type of intelligent device station.
Refer to the user's manual of the intelligent device used.

5.4 Dedicated Instruction Processing Time

Indicates the dedicated instruction processing time (time from when an instruction is issued until a reply is received).

5.4.1 Master station ↔ local station

(1) Master station → local station

Indicates the time from when the master station issues an instruction until it receives a reply from a local station.

[Expression]

(a) For reading

MB = [SM + LS × 2 + α + SL + LS × 2 + {(No. of reading points + 16)/16}*1 × LS + β + constant bps] × N [ms]

SM : Master station sequence scan time

SL : Local station sequence scan time

LS : Link scan time (Refer to section 5.2)

α : Send end internal processing time

No. of reading points	1 to 120 points	121 to 240 points	241 to 360 points	361 to 480 points
α	LS	LS × 2	LS × 3	LS × 4

β : Receive end internal processing time

LS

[Constant bps]

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
constant bps	LS	LS × 2	LS × 4	LS × 6	LS × 7

N : No. of execution instructions simultaneously

*1 : Raise the decimals to a unit

(Example) When master station sequence scan time is 10ms, local station sequence scan time is 10ms, link scan time is 5ms, no. of reading points is 20 words, transmission speed is 10Mbps, no. of execution instructions simultaneously is 1

MB = [SM + LS × 2 + α + SL + LS × 2 + {(No. of reading points + 16)/16}*1 × LS + β + constant bps] × N

= [10 + 5 × 2 + 5 + 10 + 5 × 2 + {(20 + 16)/16}*1 × 5 + 5 + 5 × 7] × 1

= [10 + 5 × 2 + 5 + 10 + 5 × 2 + 3 × 5 + 5 + 5 × 7] × 1

= 100 [ms]

(b) For writing

MB = [SM + LS + {(No. of writing points + 16)/72}$*1$ × LS + α
+ SL + LS × 3 + β + constant bps] × N [ms]

SM : Master station sequence scan time
SL : Local station sequence scan time
LS : Link scan time (Refer to section 5.2)
α : Send end internal processing time
LS
β : Receive end internal processing time
LS

[Constant bps]

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
constant bps	LS	LS × 2	LS × 4	LS × 6	LS × 7

N : No. of execution instructions simultaneously
*1 : Raise the decimals to a unit

(Example) When master station sequence scan time is 10ms, local station sequence scan time is 10ms, link scan time is 5ms, no. of writing points is 20 words, transmission speed is 10Mbps, no. of execution instructions simultaneously is 1

MB = [SM + LS + {(No. of writing points + 16)/72}$*1$ × LS + α
+ SL + LS × 3 + β + constant bps] × N
= [10 + 5 + {(20 + 16)/72}$*1$ × 5 + 5 + 10 + 5 × 3 + 5 + 5 × 7] × 1
= [10 + 5 +1 × 5 + 5 + 10 + 5 × 3 + 5 + 5 × 7] × 1
= 90 [ms]

(2) Local station → master station

Indicates the time from when a local station issues an instruction until it receives a reply from the master station.

[Expression]

(a) For reading

MB = [SL + LS × 3 + α + SM + LS + {(No. of reading points +16)/72}*1 × LS + β + constant bps] × N [ms]

SM : Master station sequence scan time

SL : Local station sequence scan time

LS : Link scan time (Refer to section 5.2)

α : Send end internal processing time

LS

β : Receive end internal processing time

LS

[Constant bps]

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
constant bps	LS	LS × 2	LS × 4	LS × 6	LS × 7

N : No. of execution instructions simultaneously

*1 : Raise the decimals to a unit

(Example) When master station sequence scan time is 10ms, local station sequence scan time is 10ms, link scan time is 5ms, no. of reading points is 20 words, transmission speed is 10Mbps, no. of execution instructions simultaneously is 1

MB = [SL + LS × 3 + α + SM + LS + {(No. of reading points +16)/72}*1 × LS + β + constant bps] × N

= [10 + 5 × 3 + 5 + 10 + 5 + {(20 + 16)/72} × 5 + 5 + 5 × 7] × 1

= [10 + 5 × 3 + 5 + 10 + 5 + 1 × 5 + 5 + 5 × 7] × 1

= 90 [ms]

(b) For writing

MB = [SL + LS × 2 + {(No. of writing points + 16)/16}*1 × LS + α
+ SM + LS × 2 + β + constant bps] × N [ms]

SM : Master station sequence scan time

SL : Local station sequence scan time

LS : Link scan time (Refer to section 5.2)

α : Send end internal processing time

No. of writing points	1 to 120 points	121 to 240 points	241 to 360 points	361 to 480 points
α	LS	LS × 2	LS × 3	LS × 4

β : Receive end internal processing time
LS

[Constant bps]

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
constant bps	LS	LS × 2	LS × 4	LS × 6	LS × 7

N : No. of execution instructions simultaneously

*1 : Raise the decimals to a unit

(Example) When master station sequence scan time is 10ms, local station sequence scan time is 10ms, link scan time is 5ms, no. of writing points is 20 words, transmission speed is 10Mbps, no. of execution instructions simultaneously is 1

MB = [SL + LS × 2 + {(No. of writing points + 16)/16}*1 × LS + α
+ SM + LS × 2 + β + constant bps] × N
= [10 + 5 × 2 + {(20 + 16)/16} × 5 + 5 + 10 + 5 × 2 + 5 + 5 × 7] × 1
= [10 + 5 × 2 + 3 × 5 + 5 + 10 + 5 × 2 + 5 + 5 × 7] × 1
= 100 [ms]

5.4.2 Local station ↔ local station

(1) Local station → local station

Indicates the time from when a local station issues an instruction until it receives a reply from another local station.

[Expression]

(a) For reading

$$MB = [SL_1 + LS \times 3 + \alpha + SL_2 + LS \times 2 + \{(\text{No. of reading points} + 16)/16\}^{*1} \times LS + \beta + \text{constant bps}\ ] \times N\ [ms]$$

SL_1: Send end local station sequence scan time

SL_2: Receive end local station sequence scan time

LS : Link scan time (Refer to section 5.2)

α : Send end internal processing time

No. of reading points	1 to 120 points	121 to 240 points	241 to 360 points	361 to 480 points
α	LS	LS × 2	LS × 3	LS × 4

β : Receive end internal processing time

LS

[Constant bps]

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
constant bps	LS	LS × 2	LS × 4	LS × 6	LS × 7

N : No. of execution instructions simultaneously

*1 : Raise the decimals to a unit

(Example) When send end local station sequence scan time is 10ms, receive end local station sequence scan time is 10ms, link scan time is 5ms, no. of reading points is 20 words, transmission speed is 10Mbps, no. of execution instructions simultaneously is 1

$$MB = [SL_1 + LS \times 3 + \alpha + SL_2 + LS \times 2 + \{(\text{No. of reading points} + 16)/16\}^{*1} \times LS + \beta + \text{constant bps}\ ] \times N$$

$$= [10 + 5 \times 3 + 5 + 10 + 5 \times 2 + \{(20 + 16)/16\}^{*1} \times 5 + 5 + 5 \times 7] \times 1$$

$$= [10 + 5 \times 3 + 5 + 10 + 5 \times 2 + 3 \times 5 + 5 + 5 \times 7] \times 1$$

$$= 105\ [ms]$$

(b) For writing

MB = [SL_1 + LS × 2 + {(No. of writing points + 16)/16}^{*1} × LS + α
+ SL_2 + LS × 3 + β + constant bps] × N [ms]

SL_1: Send end local station sequence scan time

SL_2: Receive end local station sequence scan time

LS : Link scan time (Refer to section 5.2)

α : Send end internal processing time

No. of writing points	1 to 120 points	121 to 240 points	241 to 360 points	361 to 480 points
α	LS	LS × 2	LS × 3	LS × 4

β : Receive end internal processing time

LS

[Constant bps]

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
constant bps	LS	LS × 2	LS × 4	LS × 6	LS × 7

N : No. of execution instructions simultaneously

*1 : Raise the decimals to a unit

(Example) When send end local station sequence scan time is 10ms, receive end local station sequence scan time is 10ms, link scan time is 5ms, no. of writing points is 20 words, transmission speed is 10Mbps, no. of execution instructions simultaneously is 1

MB = [SL_1 + LS × 2 + {(No. of writing points + 16)/16}^{*1} × LS + α
+ SL_2 + LS × 3 + β + constant bps] × N

= [10 + 5 × 2 + {(20 + 16)/16}^{*1} × 5 + 5 + 10 + 5 × 3 + 5 + 5 × 7] × 1

= [10 + 5 × 2 + 3 × 5 + 5 + 10 + 5 × 3 + 5 + 5 × 7] × 1

= 105 [ms]

5.4.3 Master station ↔ intelligent device station

(1) Master station → intelligent device station

Indicates the time from when the master station issues an instruction until it receives a reply from an intelligent device station.

[Expression]

(a) For reading

MB = [SM + LS × 2 + α + SM + LS × 2 + {(No. of reading points + 16)/16}*1 × LS + β + constant bps] × N [ms]

SM : Master station sequence scan time

LS : Link scan time (Refer to section 5.2)

α : Send end internal processing time

No. of reading points	1 to 120 points	121 to 240 points	241 to 360 points	361 to 480 points
α	LS	LS × 2	LS × 3	LS × 4

β : Receive end internal processing time

LS

[Constant bps]

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
constant bps	LS	LS × 2	LS × 4	LS × 6	LS × 7

N : No. of execution instructions simultaneously

*1 : Raise the decimals to a unit

(Example) When master station sequence scan time is 10ms, link scan time is 5ms, no. of reading points is 20 words, transmission speed is 10Mbps, no. of execution instructions simultaneously is 1

MB = [SM + LS × 2 + α + SM + LS × 2 + {(No. of reading points + 16)/16}*1 × LS + β + constant bps] × N

= [10 + 5 × 2 + 5 + 10 + 5 × 2 + {(20 + 16)/16}*1 × 5 + 5 + 5 × 7] × 1

= [10 + 5 × 2 + 5 + 10 + 5 × 2 + 3 × 5 + 5 + 5 × 7] × 1

= 100 [ms]

(b) For writing

MB = [SM + LS + {(No. of writing points + 16)/72}^{*1} × LS + α
+ SM + LS × 3 + β + constant bps] × N [ms]

SM : Master station sequence scan time

LS : Link scan time (Refer to section 5.2)

α : Send end internal processing time
LS

β : Receive end internal processing time
LS

[Constant bps]

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
constant bps	LS	LS × 2	LS × 4	LS × 6	LS × 7

N : No. of execution instructions simultaneously

*1 : Raise the decimals to a unit

(Example) When master station sequence scan time is 10ms, link scan time is 5ms, no. of writing points is 20 words, transmission speed is 10Mbps, no. of execution instructions simultaneously is 1

MB = [SM + LS + {(No. of writing points + 16)/72}^{*1} × LS + α
+ SM + LS × 3 + β + constant bps] × N
= [10 + 5 + {(20 + 16)/72}^{*1} × 5 + 5 + 10 + 5 × 3 + 5 + 5 × 7] × 1
= [10 + 5 + 1 × 5 + 5 + 10 + 5 × 3 + 5 + 5 × 7] × 1
= 90 [ms]

MEMO

6. PARAMETER SETTING

The parameter setting necessary to perform data link with CC-Link is described.

6.1 Procedure from Parameter Setting to Data Link Startup

The flow from setting the parameters to starting the data link is described.

6.1.1 Relationship between buffer memory, E^2PROM and internal memory

The relationship between the master station buffer memory, E^2PROM and the internal memory is described.

(1) Buffer memory

This is a temporary storage area to write the parameter information to E^2PROM or internal memory.
When the module power is turned off, the parameter information is erased.

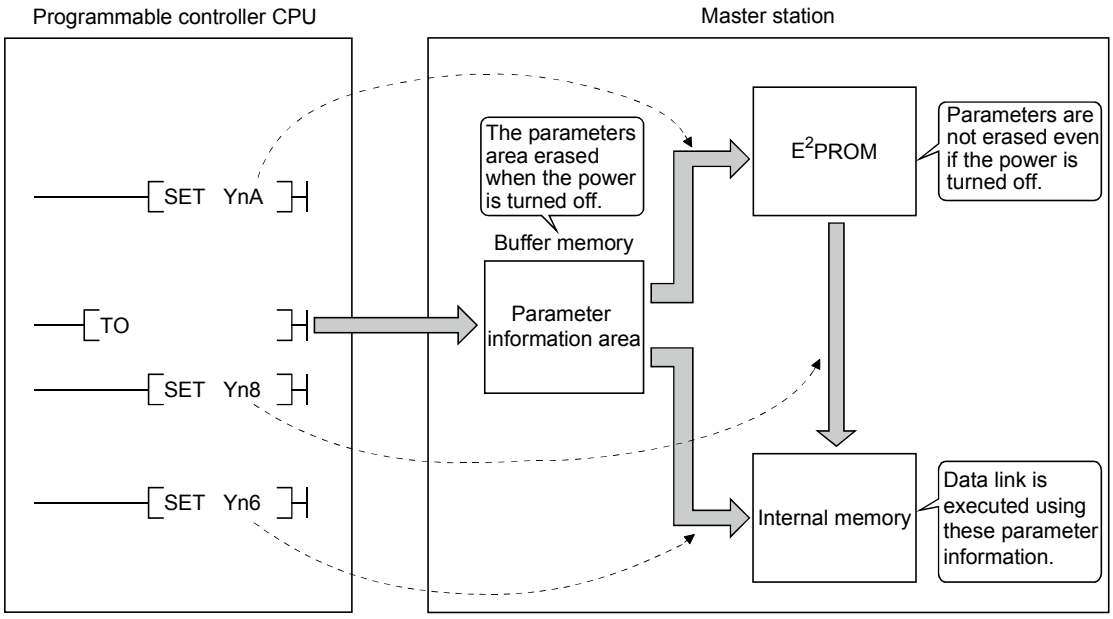
(2) E^2PROM

By just turning on the data-link start request by the E^2PROM parameters (Yn8), data link can be started.
This eliminates having to write parameters to the buffer memory every time when starting up the master station.
However, the parameters must be stored in E^2PROM by the parameter storage request to E^2PROM (YnA) beforehand.
Even when the power is turned off, the E^2PROM parameter information will be kept.
The registration limit to E^2PROM is "10,000 times".

(3) Internal memory

Data link is executed using the parameter information stored in the internal memory.

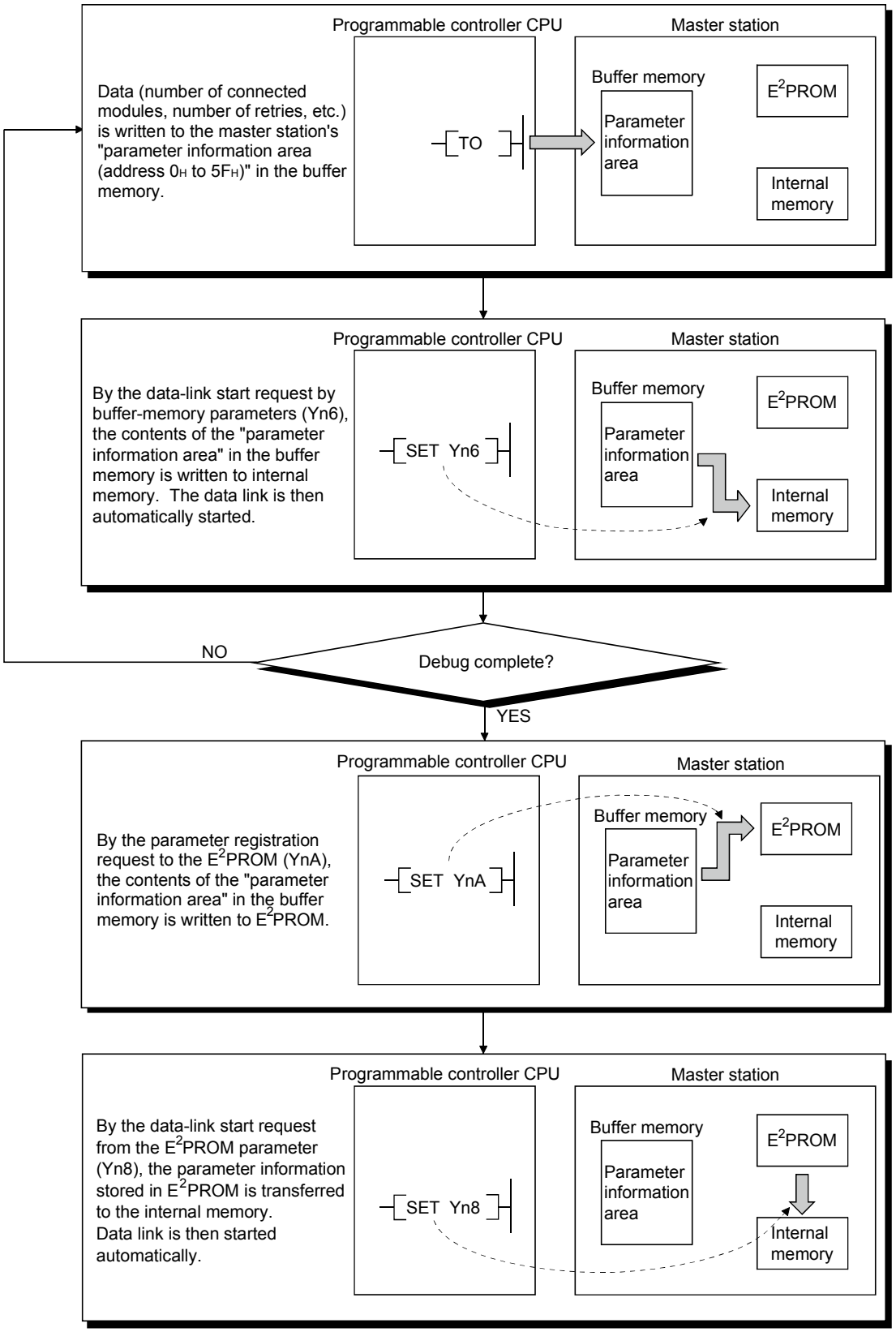
When the module power is turned off, the parameters are erased.



POINT
"Data link by buffer-memory parameters" is recommended for starting system debugging, and "data link by E^2PROM parameters" is recommended for the operation after debugging. Therefore, the number of steps in the operation program can be reduced (thus, shortens the scan time).

6.1.2 Procedure from parameter setting to data link start

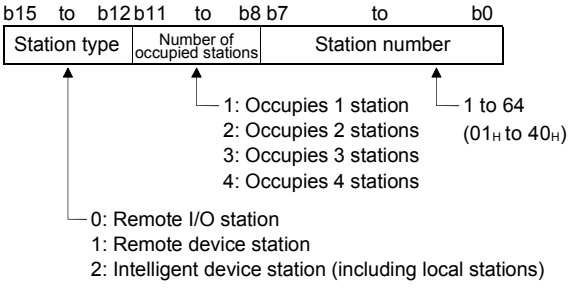
Follow the procedure below:



6.2 Parameter Settings

The items to set in the master station's "parameter information area (address 0H to 5FH)" in the buffer memory is shown in Table 6.1.
Refer to Section 3.5.2 for details of each item.

Table 6.1 Parameter setting items

Setting item	Description	Buffer memory address	Reference
Number of connected modules	Sets the number of modules in the remote and local stations connected to the master station (including reserved stations) Default : 64 (modules) Setting range : 1 to 64 (modules)	1H	Section 3.5.2 (1) (a)
Number of retries	Sets the number of retries when there is a communication error. Default : 3 (times) Setting range : 1 to 7 (times)	2H	Section 3.5.2 (1) (b)
Number of automatic return modules	Sets the number of remote and local stations that can be recovered with one link scan. Default : 1 (modules) Setting range : 1 to 10 (modules)	3H	Section 3.5.2 (1) (c)
Operation specification when CPU is down	Specifies the data-link status when the master station programmable controller CPU has an error. Default : 0 (stop) Setting range : 0 (stop) 1 (continue)	6H	Section 3.5.2 (1) (d)
Reserved station specification	Specifies reserved stations. Default : 0 (no setting) Setting range : Turn on the bit corresponding to the station number.	10H to 13H	Section 3.5.2 (1) (e)
Invalid station specification	Specifies invalid stations. Default : 0 (no setting) Setting range : Turn on the bit corresponding to the station number.	14H to 17H	Section 3.5.2 (1) (f)
Station information	Sets the connected remote and local station type. Default : 0101H (remote I/O station, occupies 1 station, station No. 1) to 0140H (remote I/O station, occupies 1 station, station No. 64) Setting range : As follows.  	20H (1st station) to 5FH (64th station)	Section 3.5.2 (1) (g)

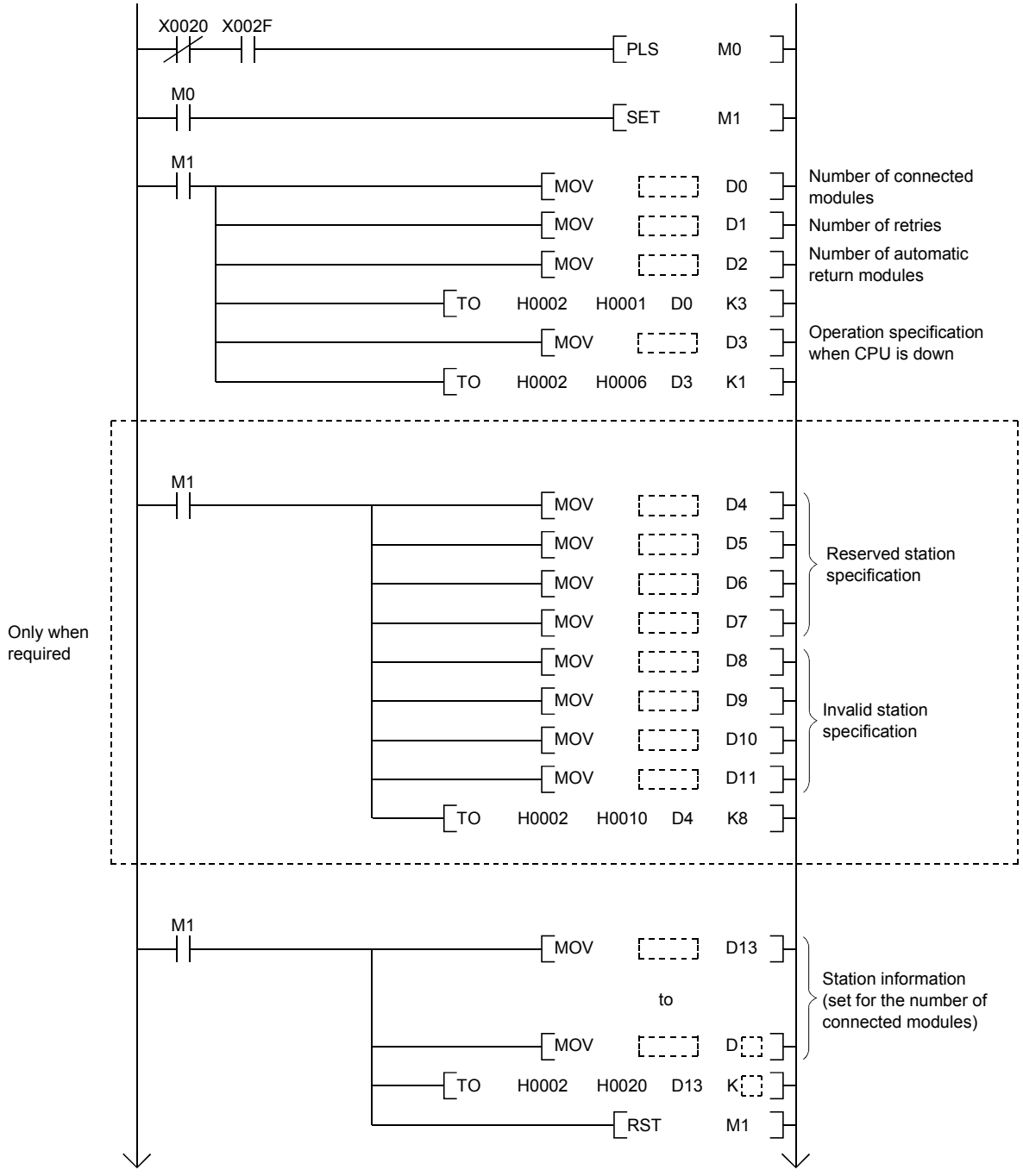
6.3 Setting from a Sequence Program

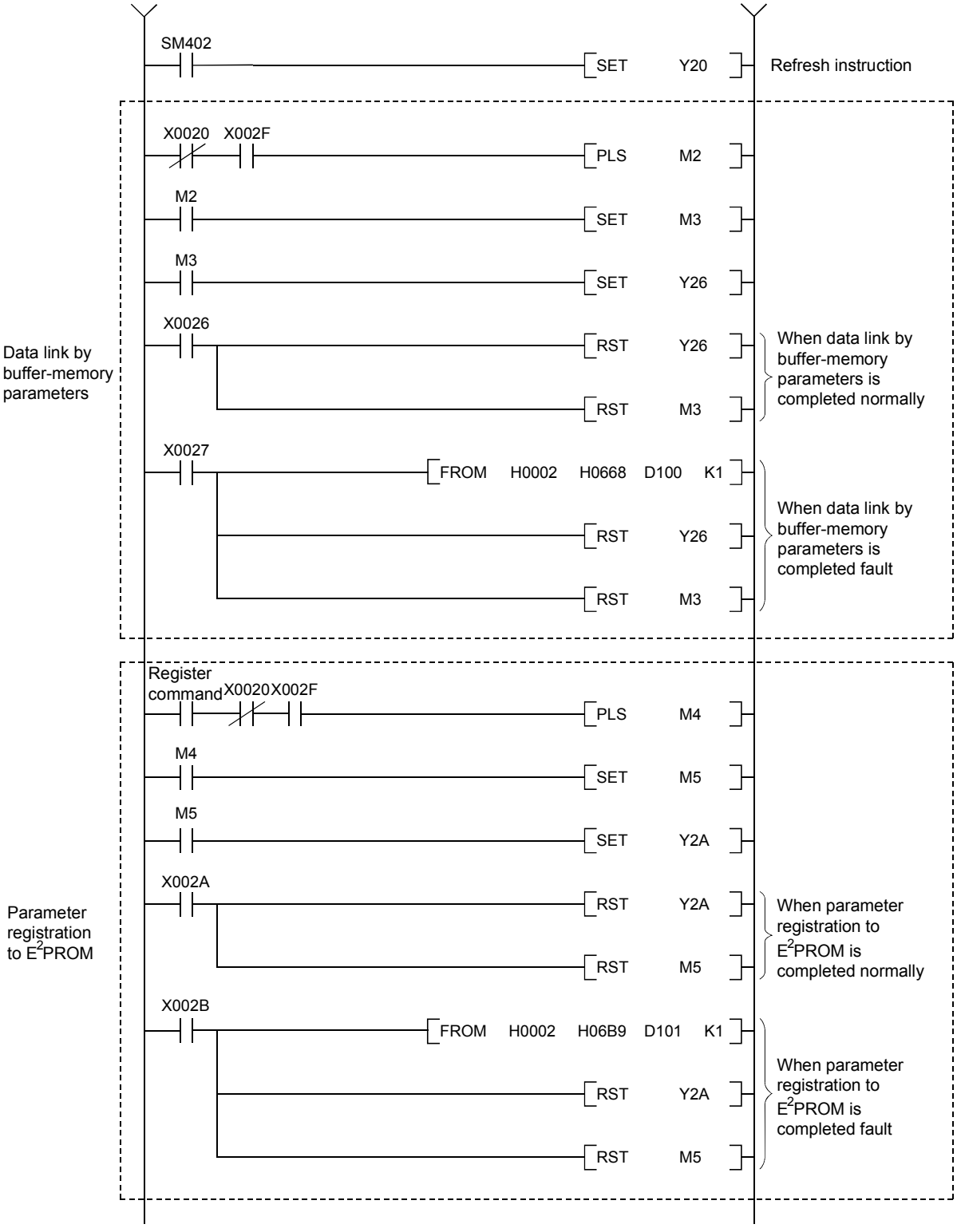
The parameter setting from a sequence program is described.

(1) Program overview

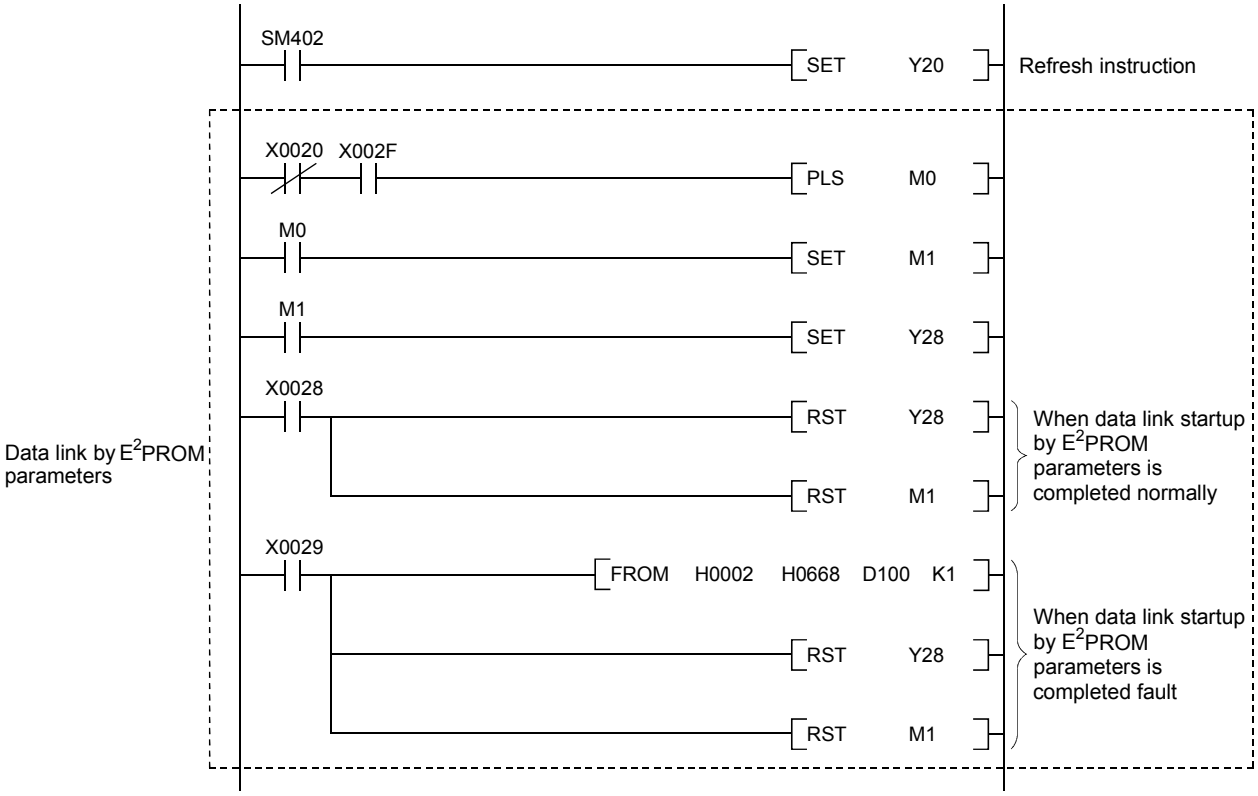
This program assumes that the master station's first I/O number is X/Y20 to 3F.

(a) When debugging




SM402
SET Y20
Refresh instruction
Data link by buffer-memory parameters
X0020 X002F
PLS M2
M2
SET M3
M3
SET Y26
X0026
RST Y26
RST M3
When data link by buffer-memory parameters is completed normally
X0027
FROM H0002 H0668 D100 K1
RST Y26
RST M3
When data link by buffer-memory parameters is completed fault
Register command
X0020 X002F
PLS M4
M4
SET M5
M5
SET Y2A
Parameter registration to E2PROM
X002A
RST Y2A
RST M5
When parameter registration to E2PROM is completed normally
X002B
FROM H0002 H06B9 D101 K1
RST Y2A
RST M5
When parameter registration to E2PROM is completed fault

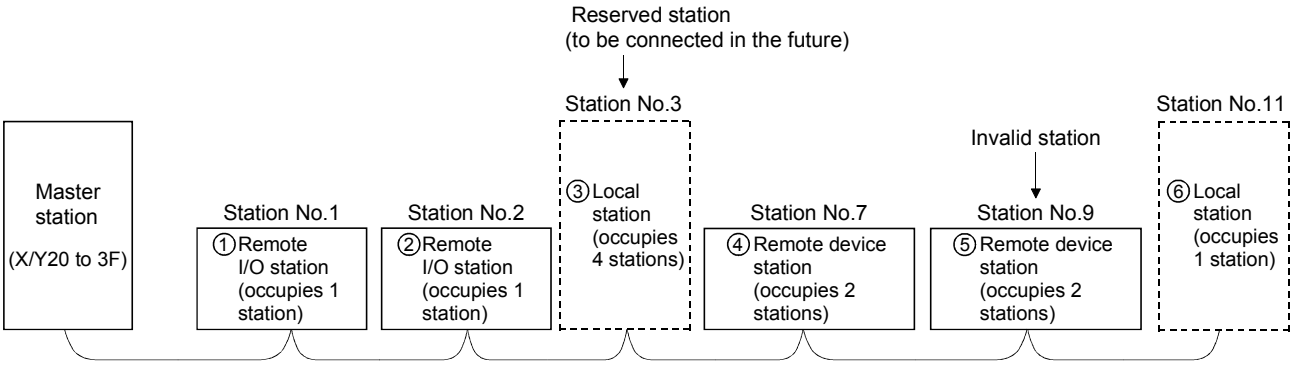
(b) During operation



(2) Program example

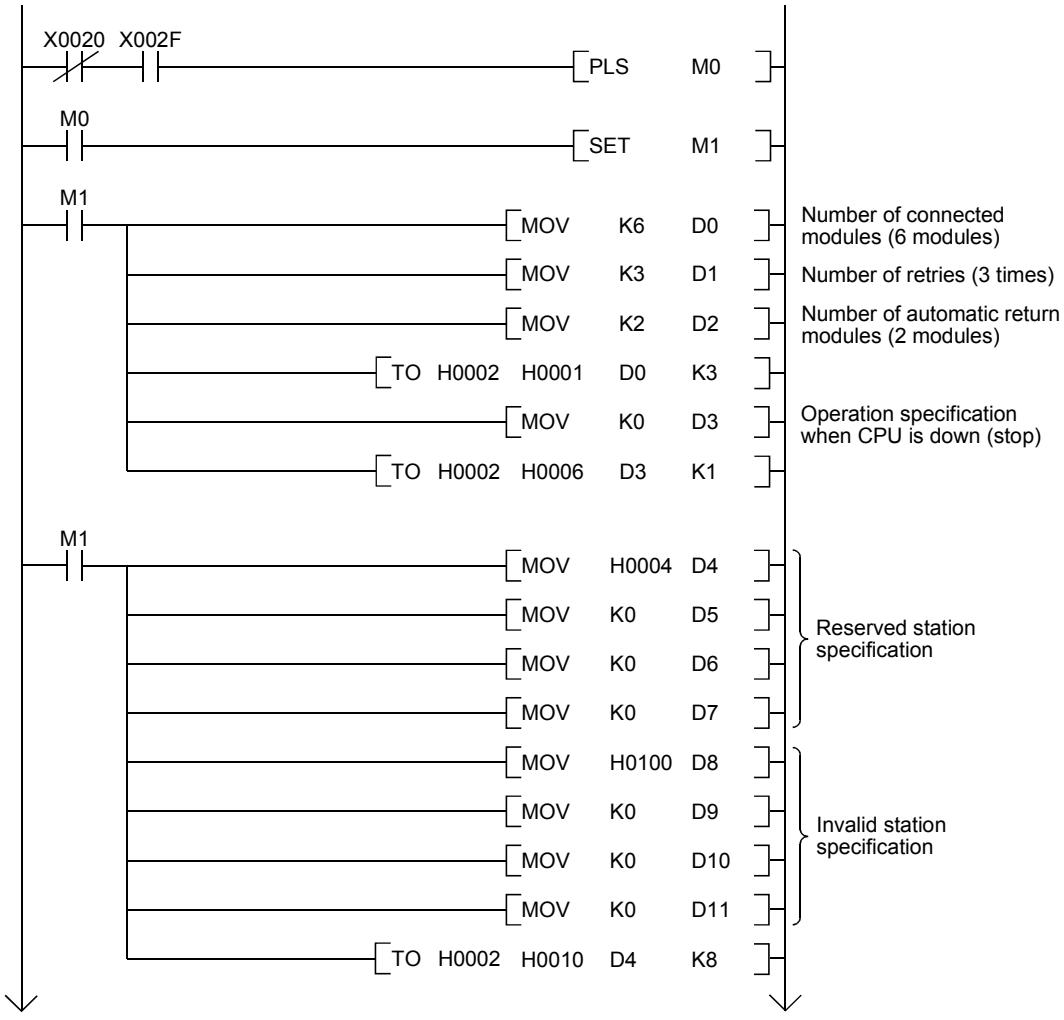
A parameter-setting program example with the following system configuration is shown below:

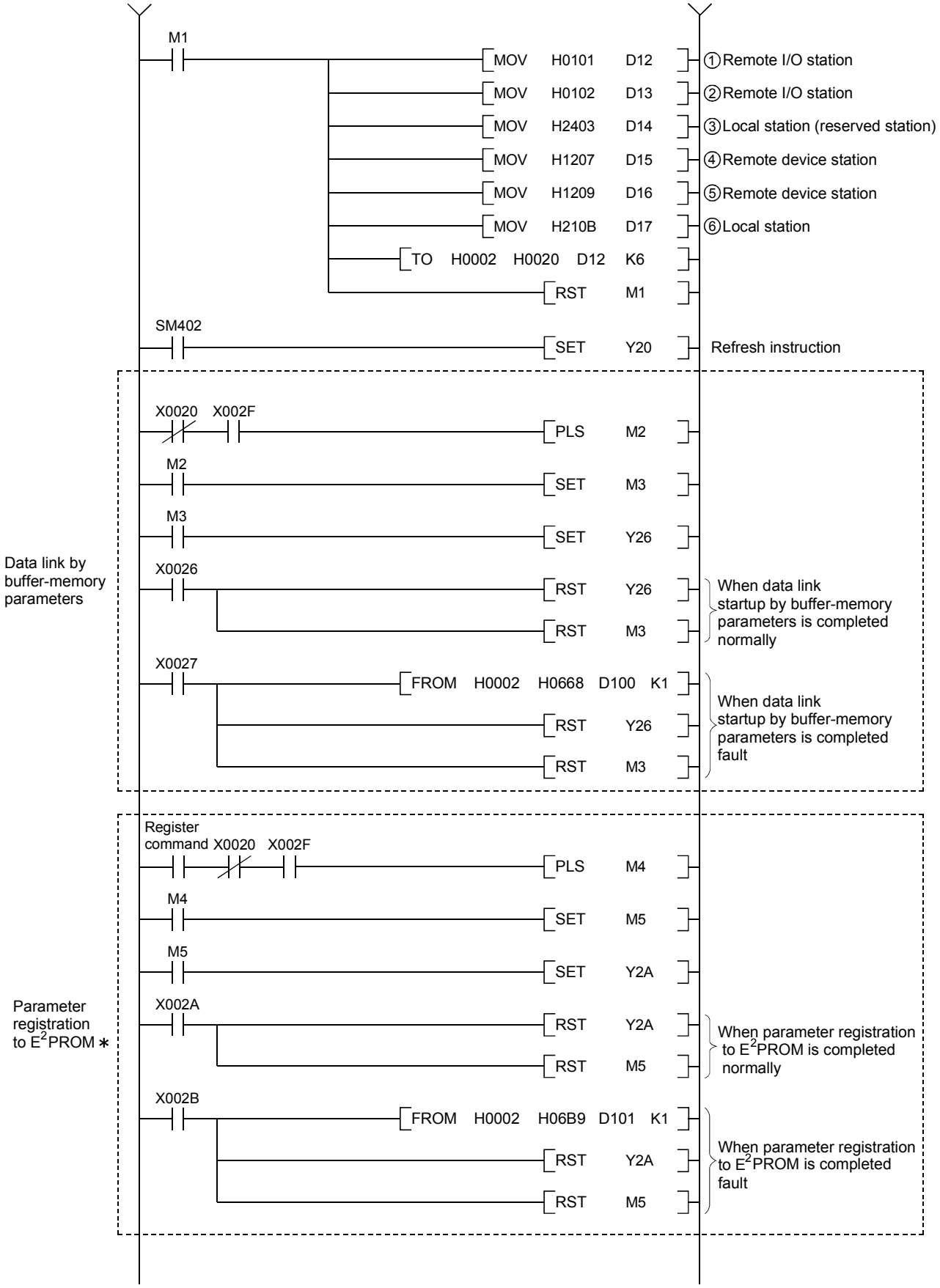
(a) System configuration example



(b) Program example

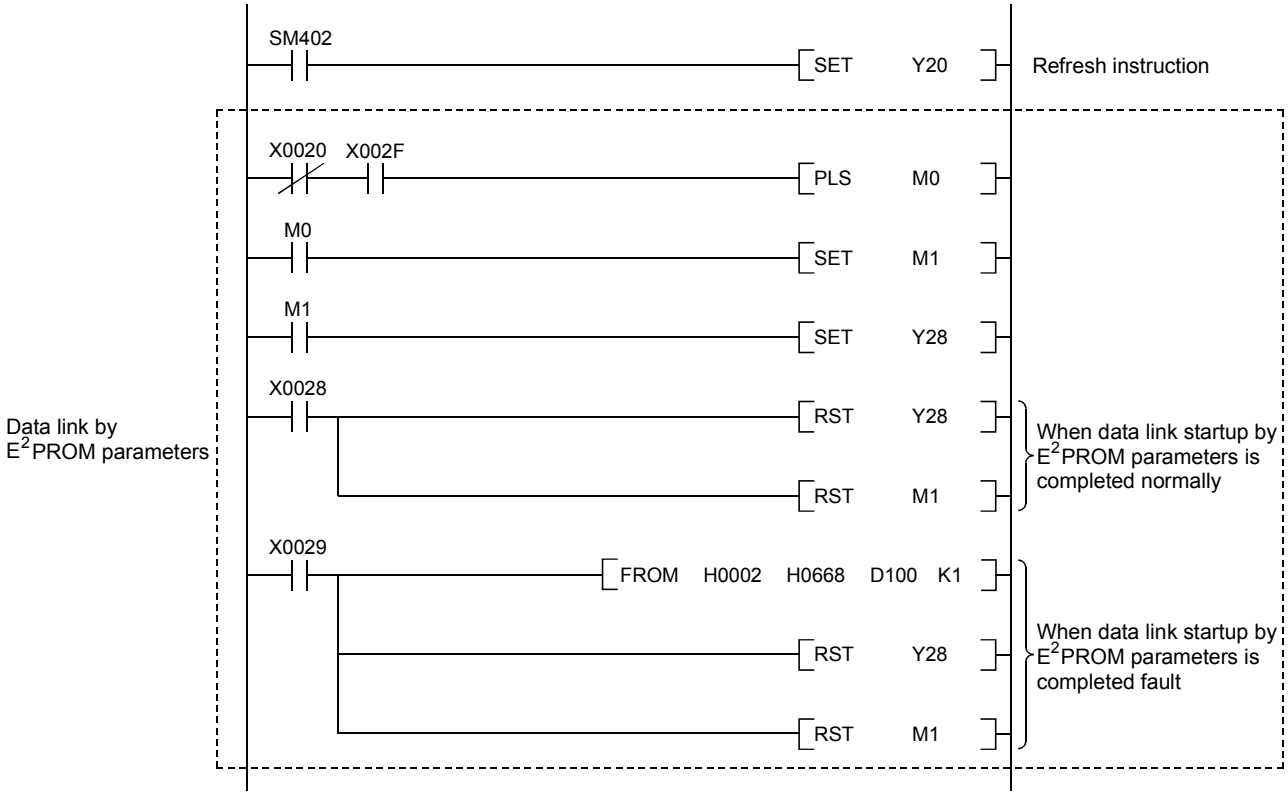
① When debugging





∗: Refer to Section 8.2 when using the software version E (manufactured in Aug., 2001) or later of the A1SJ61QBT11.

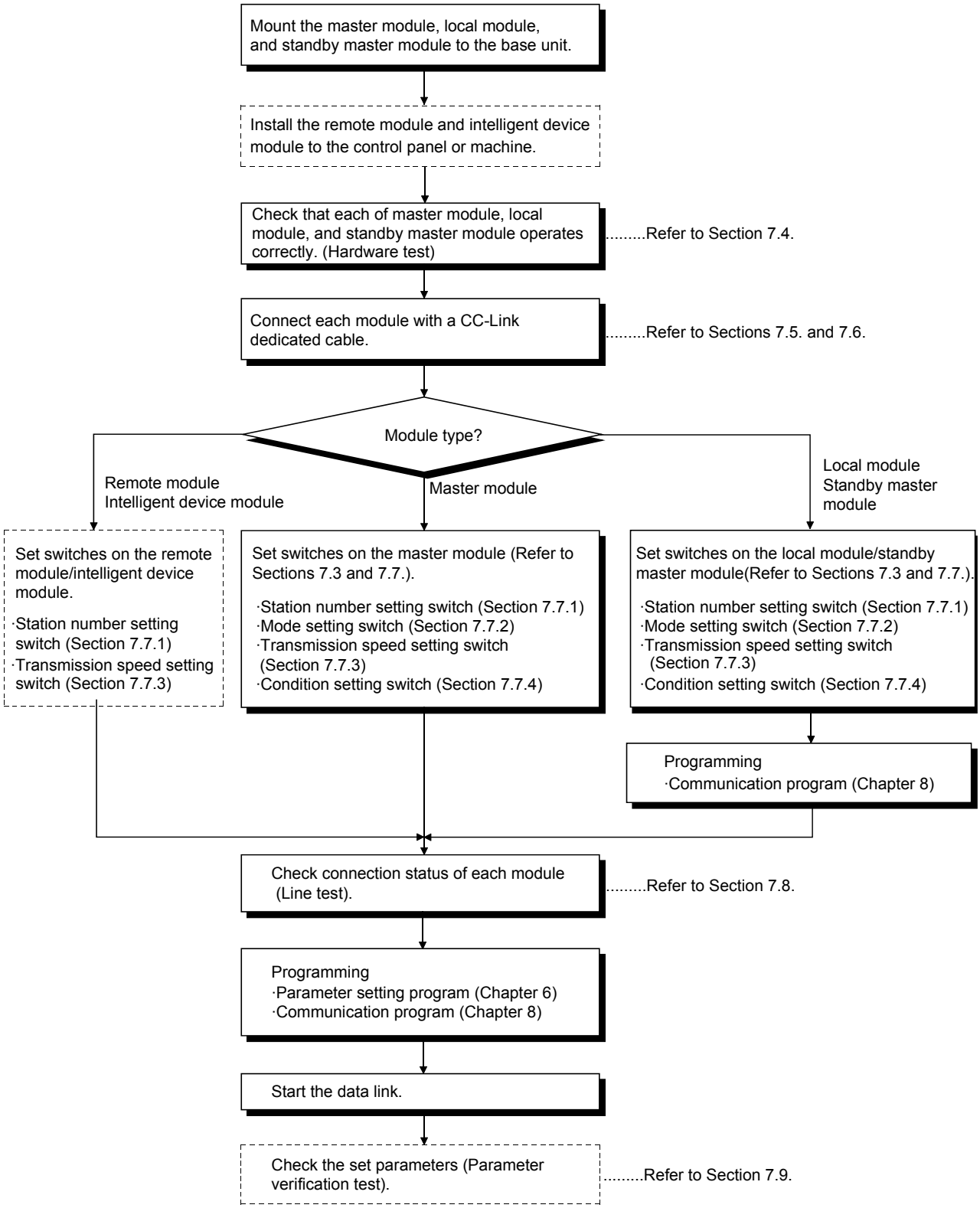
② During operation



7. DATA LINK PROCEDURE

7.1 Data Link Procedure

The procedure of performing CC-Link's data link is shown below:



7.2 Installation and Setting

The following section explains the precautions when handling the master and local modules, from the time they are unpacked until they are installed.
For more details on the module installation, see the user's manual for the CPU module used.

7.2.1 Precautions when handling the module

(1) Do not drop the module case or subject it to heavy impact since it is made of resin.

(2) Do not remove the print circuit board of each module from its case. This may cause a failure in the module.

(3) Prevent foreign matter such as dust or wire chips from entering the module.
Such foreign matter can cause a fire, failure, or malfunction.

(4) Solderless terminals with insulation sleeve cannot be used for the terminal block.
It is recommended that the wiring connecting sections of the solderless terminals will be covered with a marking tube or an insulation tube.

(5) Before handling the module, touch a grounded metal object to discharge the static electricity from the human body.
Failure to do so may cause the module to fail or malfunction.

(6) Tighten the module mounting screws and terminal screws within the following torque range.

Screw location	Tightening torque range
Module mounting screw (M4 screw)	0.78 to 1.18 N·m
Terminal-block screw (M3.5 screw)	0.59 to 0.88 N·m
Terminal-block installation screw (M3.5 screw)	0.49 to 0.78 N·m

(7) Insert the tabs at the bottom of the module into the holes in the base unit before mounting the module.
(For the Q2AS series modules, make sure screws are securely tightened to the base unit with the specified torque.)
Incorrect mounting may cause malfunction, failure, or drop of the module.

POINT

(1) Turn off the power supply to the applicable station before installing or removing the terminal block.
If the terminal block is installed or removed without turning off the power supply to the applicable station, correct data transmission cannot be guaranteed.
(2) Power off the system in advance when removing the terminating resistor to change the system. If the terminating resistor is removed and installed while the system is energized, normal data transmission will not be guaranteed.

7.2.2 Setting environment

To install the A-series programmable controller, avoid the following environment:

(1) Areas where the ambient temperature exceeds the range of 0 to 55°C

(2) Areas where the ambient humidity exceeds the range of 10 to 90%RH

(3) Areas where condensation appears from sudden temperature changes

(4) Areas with corrosive or flammable gas

(5) Areas with a lot of dust, conductive metal pieces, oil mist, sodium or organic solvents

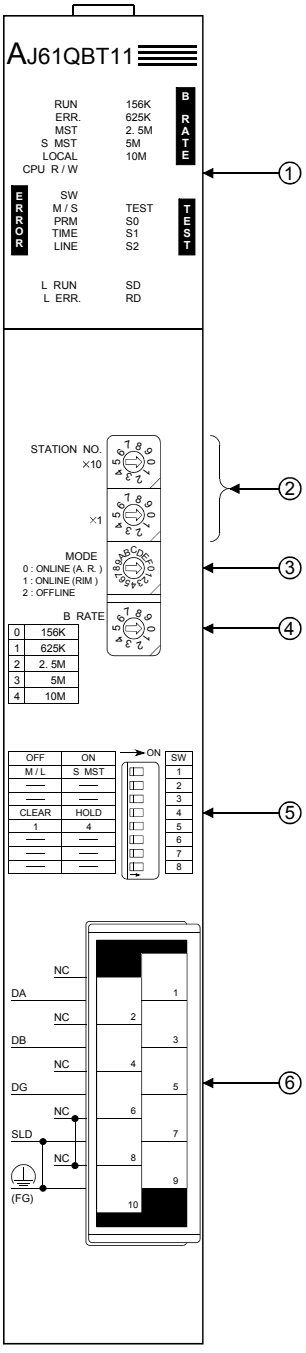
(6) Areas with direct sunlight

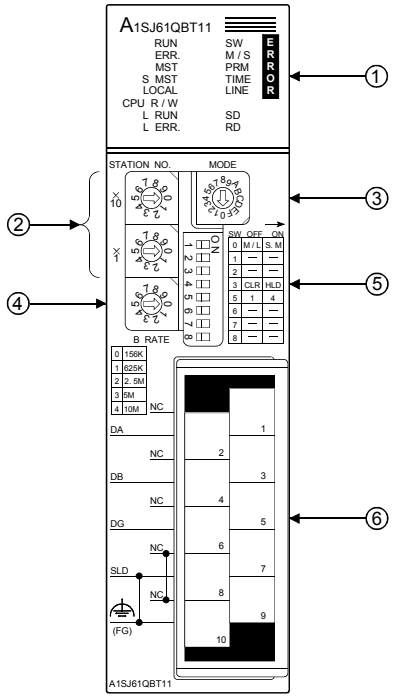
(7) Areas where strong electric or magnetic fields are formed

(8) Areas where direct vibration or shock is applied

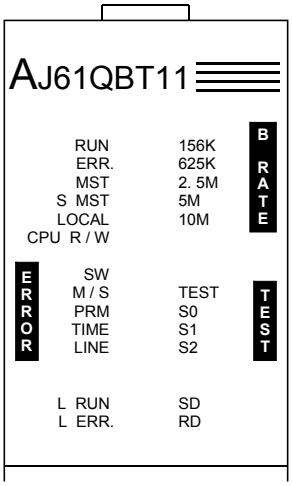
7.3 Name of Each Part and Settings

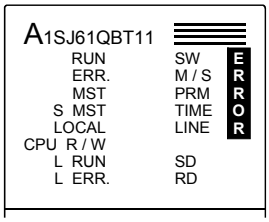
The name of each part in the master/local module, contents of LED display and the setting method of each switch are described.





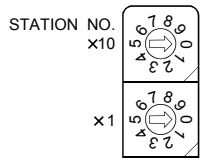
No.	Name	Description
①	LED display	Data-link status can be checked from the LED on status.

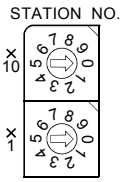


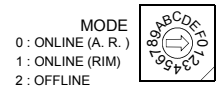


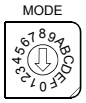
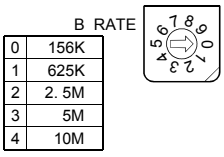
LED name		Description	LED display status: • Master station • Standby master station in controlling the system – When normal	LED display status: • Master station • Standby master station in controlling the system – When error	LED display status: • Local station • Standby master station on standby – When normal	LED display status: • Local station • Standby master station on standby – When error
RUN		ON: Module is normal. OFF: Watchdog timer error.	On	Off	On	Off
ERR.		Indicates the communication status with the station set in the parameter. ON: Communication error at all stations. Flashing: Communication faulty station exists.	Off	On or flashing	Off	On or flashing
MST		ON: Set as a master station.	On	–	Off	–
S MST		ON: Set as a standby master station.	(On)	–	(On)	–
LOCAL		ON: Set as a local station.	Off	–	On	–
CPU R/W		ON: Communicating with programmable controller CPU. (FROM/TO)	On	Off	On	Off
ERROR	SW	ON: Switch setting error	Off	On	Off	On
	M/S	ON: Master station already exists on the same line. Flashing: Occupied station count overlapping (With the exception of the first station number overlapping)	Off	On or flashing	–	–
	PRM	ON: Parameter setting error.	Off	On	–	–
	TIME	ON: Cable disconnection, or no response from all stations due to noise in a communication path	Off	On	–	–
	LINE	ON: Cable disconnection, or transmission path is affected by noise, etc.	Off	On	Off	On
L RUN		ON: In data link. (host) ＊1	On	Off	On	Off
L ERR.		ON: Communication error (host) Flashing at regular intervals: The setting(s) of switches ② to ⑤ was changed while the power was on. ＊2 Flashing at irregular intervals: Terminating resistor is not connected, or module and/or CC-Link dedicated cable is affected by noise.	Off	On or flashing	Off	On or flashing
BRATE	156K	ON: Transmission speed is set to "156 kbps"	④ Transmission speed set by the transmission speed setting switch is turned on.			
	625K	ON: Transmission speed is set to "625 kbps"				
	2.5M	ON: Transmission speed is set to "2.5 Mbps"				
	5M	ON: Transmission speed is set to "5 Mbps"				
	10M	ON: Transmission speed is set to "10 Mbps"				
TEST	TEST	ON: Offline test in progress	Refer to Sections 7.4 and 7.8.		Refer to Section 7.4.	
	S0	(Not used)				
	S1					
	S2					
SD		ON: Sending data	On	Off	On	Off
RD		ON: Receiving data	On	Off	On	Off

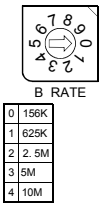
＊1 When the module is operated in the synchronous mode, the LED may be lit dimly.
＊2 When all stations are in error, changes on switches may not be detected.

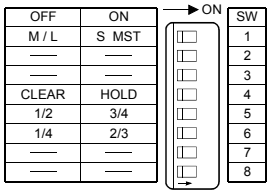
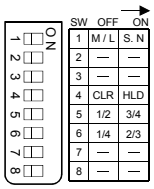
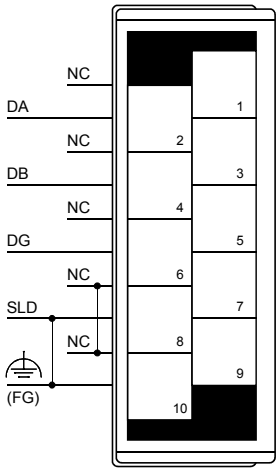
<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>②</td><td>Station number setting switch
AJ61QBT11
 

A1SJ61QBT11
 
</td><td>Sets the module's station number (setting at shipment: 0)
<Range>
• In the remote net mode
Master station : 0
local station : 1 to 64
Standby master station : 1 to 63
The "SW" and "L ERR." LEDs are turned on when a value other than 0 to 64 is set.

• In the remote I/O net mode
Master station : 1 to 64 (Set the last station number of remote I/O stations)
The "PLM" LED is turned on when "0" is set.</td></tr>
<tr><td>③</td><td>Mode setting switch
AJ61QBT11
 

A1SJ61QBT11
 
</td><td>Sets the module operation status. (setting at shipment: 0)
<table><tr><th rowspan="2">Number</th><th rowspan="2">Name</th><th rowspan="2">Description</th><th colspan="2">Setting</th></tr><tr><th>Master station</th><th>Local station</th></tr><tr><td>0</td><td>Online (remote net mode)</td><td>Set when data link is made in remote net mode.</td><td>Enabled</td><td>Enabled</td></tr><tr><td>1</td><td>Online
(remote I/O net mode)</td><td>Set when data link is made in remote I/O net mode.</td><td>Enabled</td><td>Disabled</td></tr><tr><td>2</td><td>Offline</td><td>Data-link disconnection status</td><td>Enabled</td><td>Enabled</td></tr><tr><td>3</td><td>Line Test 1</td><td>Refer to Section 7.8.1.</td><td>Enabled</td><td>Disabled</td></tr><tr><td>4</td><td>Line Test 2</td><td>Refer to Section 7.8.2.</td><td>Enabled</td><td>Disabled</td></tr><tr><td>5</td><td>Parameter verification test</td><td>Refer to Section 7.9.</td><td>Enabled</td><td>Disabled</td></tr><tr><td>6</td><td>Hardware test</td><td>Refer to Section 7.4.</td><td>Enabled</td><td>Enabled</td></tr><tr><td>7</td><td>(Unusable)</td><td>Setting error (the "SW" LED on)</td><td>–</td><td>–</td></tr><tr><td>8</td><td>(Unusable)</td><td>Cannot be set because of being used</td><td>–</td><td>–</td></tr><tr><td>9</td><td>(Unusable)</td><td>Cannot be set because of being used</td><td>–</td><td>–</td></tr><tr><td>A</td><td>(Unusable)</td><td>Cannot be set because of being used</td><td>–</td><td>–</td></tr><tr><td>B</td><td>(Unusable)</td><td>Setting error (the "SW" LED on)</td><td>–</td><td>–</td></tr><tr><td>C</td><td>(Unusable)</td><td>Setting error (the "SW" LED on)</td><td>–</td><td>–</td></tr><tr><td>D</td><td>(Unusable)</td><td>Setting error (the "SW" LED on)</td><td>–</td><td>–</td></tr><tr><td>E</td><td>(Unusable)</td><td>Setting error (the "SW" LED on)</td><td>–</td><td>–</td></tr><tr><td>F</td><td>(Unusable)</td><td>Setting error (the "SW" LED on)</td><td>–</td><td>–</td></tr></table></td></tr>
<tr><td>④</td><td>Transmission speed setting switch
AJ61QBT11
 

A1SJ61QBT11
 
</td><td>Sets the module transmission speed (setting at shipment: 0)
<table><tr><th>Number</th><th>Setting details</th></tr><tr><td>0</td><td>156kbps</td></tr><tr><td>1</td><td>625kbps</td></tr><tr><td>2</td><td>2.5Mbps</td></tr><tr><td>3</td><td>5Mbps</td></tr><tr><td>4</td><td>10Mbps</td></tr><tr><td>5</td><td>Setting error (the "SW" and "L ERR." LED on)</td></tr><tr><td>6</td><td>Setting error (the "SW" and "L ERR." LED on)</td></tr><tr><td>7</td><td>Setting error (the "SW" and "L ERR." LED on)</td></tr><tr><td>8</td><td>Setting error (the "SW" and "L ERR." LED on)</td></tr><tr><td>9</td><td>Setting error (the "SW" and "L ERR." LED on)</td></tr></table></td></tr>
</table>

<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>⑤</td><td>Condition setting switch
AJ61QBT11
 
<table>
<tr><td>OFF</td><td>ON</td><td rowspan="9">ON</td><td>SW</td></tr>
<tr><td>M / L</td><td>S. MST</td><td>1</td></tr>
<tr><td>——</td><td>——</td><td>2</td></tr>
<tr><td>——</td><td>——</td><td>3</td></tr>
<tr><td>CLEAR</td><td>HOLD</td><td>4</td></tr>
<tr><td>1/2</td><td>3/4</td><td>5</td></tr>
<tr><td>1/4</td><td>2/3</td><td>6</td></tr>
<tr><td>——</td><td>——</td><td>7</td></tr>
<tr><td>——</td><td>——</td><td>8</td></tr>
</table>
A1SJ61QBT11
 
<table>
<tr><td rowspan="9">ON</td><td>SW</td><td>OFF</td><td>ON</td></tr>
<tr><td>1</td><td>M / L</td><td>S. M</td></tr>
<tr><td>2</td><td>—</td><td>—</td></tr>
<tr><td>3</td><td>—</td><td>—</td></tr>
<tr><td>4</td><td>CLR</td><td>HLD</td></tr>
<tr><td>5</td><td>1/2</td><td>3/4</td></tr>
<tr><td>6</td><td>1/4</td><td>2/3</td></tr>
<tr><td>7</td><td>—</td><td>—</td></tr>
<tr><td>8</td><td>—</td><td>—</td></tr>
</table>
</td><td>Sets the operation condition (setting at shipment: All is OFF)
<table>
<tr><th rowspan="2">Number</th><th rowspan="2">Setting detail</th><th rowspan="2">Description</th><th colspan="3">Setting valid/not valid</th></tr>
<tr><th>• Master station
• Standby master station in controlling the system</th><th>• Local station
• Standby master station on standby</th></tr>
<tr><td>SW1</td><td>Station type</td><td colspan="3">OFF : Master station/Local station
ON : Standby master station</td><td>(Valid)</td><td>(Valid)</td></tr>
<tr><td>SW2</td><td>(Unusable)</td><td colspan="3">Always off</td><td>–</td><td>–</td></tr>
<tr><td>SW3</td><td>(Unusable)</td><td colspan="3">Always off</td><td>–</td><td>–</td></tr>
<tr><td>SW4</td><td>Input data status of the data link error station</td><td colspan="3">OFF : Clear
ON : Hold</td><td>Valid</td><td>Valid</td></tr>
<tr><td rowspan="6">SW5
SW6</td><td rowspan="6">Number of occupied station</td><td>Number of occupied stations</td><td>SW5</td><td>SW6</td><td>–</td><td>–</td></tr>
<tr><td>1 station</td><td>OFF</td><td>OFF</td><td rowspan="4">Invalid</td><td rowspan="4">Valid</td></tr>
<tr><td>2 stations ∗3</td><td>OFF</td><td>ON</td></tr>
<tr><td>3 stations ∗3</td><td>ON</td><td>ON</td></tr>
<tr><td>4 stations</td><td>ON</td><td>OFF</td></tr>
<tr><td>SW7</td><td>(Unusable)</td><td colspan="3">Always off</td><td>–</td><td>–</td></tr>
<tr><td>SW8</td><td>(Unusable)</td><td colspan="3">Always off</td><td>–</td><td>–</td></tr>
</table>
</td></tr>
<tr><td>⑥</td><td>Terminal block
 
</td><td>Connect the CC-Link dedicated cable for data link.
Refer to Section 7.5 for how to connect the cables.

Note that the following terminals are connected inside of the module.

SLD (terminal No.8) — FG (terminal No.10)
NC (terminal No.7) — NC (terminal No.9)

2-piece type terminal block. The module can be exchanged with another without removing the signal lines from the terminal block. (Replace the module after turning off its power.)</td></tr>
</table>

∗3 The AJ61QBT11 of hardware version F or later and the A1SJ61QBT11 of hardware version G or later are compatible with this setting.
For other than the above, only SW5 is used to set the number of occupied stations.
OFF: 1 station occupied
ON : 4 stations occupied
Keep SW6 OFF as it is unusable.

POINT

The setting of switches ② to ⑤ become valid after the module power supply is turned on from off or after the programmable controller CPU is reset.
When the setting is changed while the module power supply is on, turn off and then on the module power supply or reset the programmable controller CPU again.

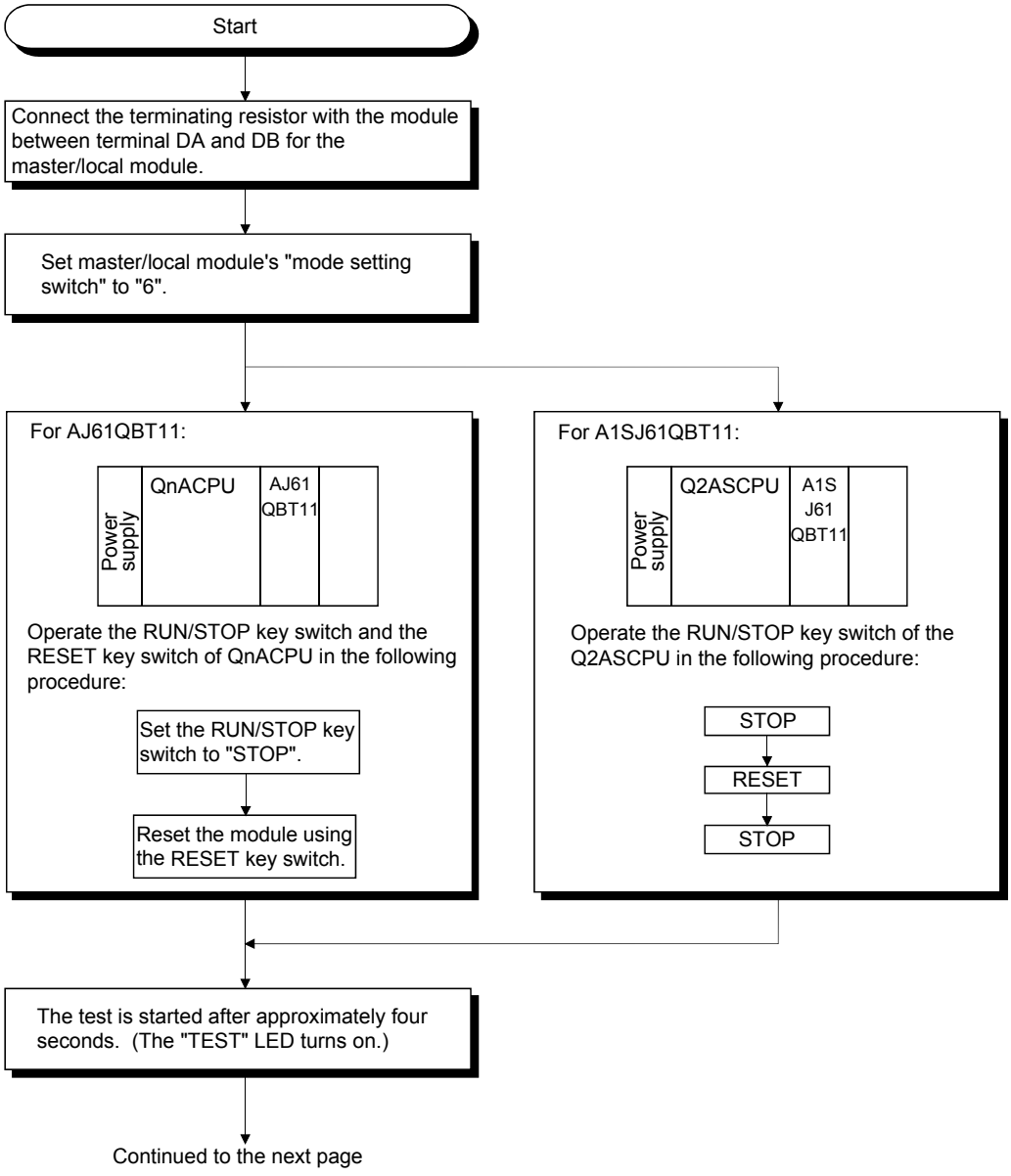
Important

Do not use station number 64 in a system where the standby master station exists.
When it is used, the station number 64 will not communicate correctly.

7.4 Checking Module Condition (Hardware Test)

The hardware test checks if the module alone operates normally.
Always perform a hardware test before configuring the system.

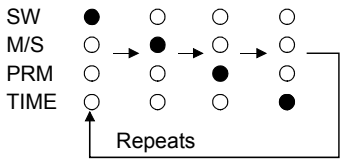
Perform a hardware test by following the procedure below:



Continued from the previous page

The test results are displayd on the "LEDs" of master · local module.

[When normal]
The LEDs are turned on in the following order:
"SW"→"M/S"→"PRM"→"TIME".



[When error]
The error description for each check item is shown below.
Replace the module if an error occurs.

Check item	LED status	Description
Self-loopback check	"SW" on	Module error
ROM check	"M/S" on	ROM error
RAM check	"PRM" on	RAM error

The "RUN" LED turns off.

End

7.5 Module Wiring with CC-Link Dedicated Cable

This section explains how to connect the master module, local modules, standby master module, remote modules and intelligent device modules with the CC-Link dedicated cables.

(1) Ver.1.10-compatible CC-Link dedicated cables, CC-Link dedicated cables (Ver.1.00), and CC-Link dedicated high-performance cables cannot be used together. If used together, correct data transmission will not be guaranteed.

(2) CC-Link cables can be connected from any station number.

(3) Connect the shielded wire of the CC-Link dedicated cable to "SLD" of each module, and ground both ends of the shielded wire to the protective ground conductor via "FG".
The SLD and FG are connected within the module.

(4) Connect the "terminating resistors" supplied with each module at both ends of the CC-Link system.
Connect the terminating resistors across "DA" and "DB".
When a T-branch system is configured, some restrictions are applied to the use of the A(1S)J61BT11/A(1S)J61QBT11 is used as the master station. Refer to Section 7.6.1 for details.

(5) The terminating resistors to be connected vary depending on the cable type used in the CC-Link system.

Cable type	Terminating resistor
CC-Link dedicated cable (Ver.1.00)	110 Ω 1/2 W (brown - brown – brown)
Version 1.10 compatible CC-Link dedicated cable	
CC-Link dedicated high performance cable	130 Ω 1/2 W (brown - orange – brown)

(6) For the terminal block screws, M3.5 screws are used.

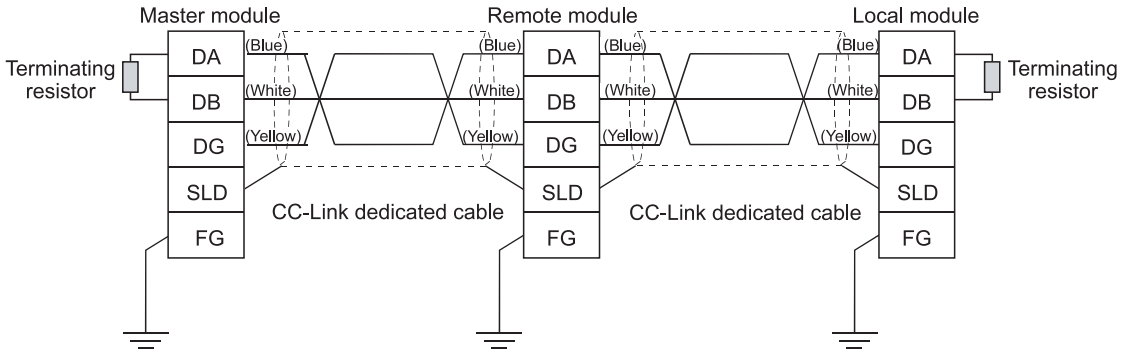
(7) Use a solderless terminal and wire described in the following table for the terminal block. Tighten the solderless terminal within the tightening torque range.
Use a UL-listed solderless terminal and a tool recommended by the manufacturer of the solderless terminal for processing. A sleeved solderless terminal cannot be used.

Solderless terminal		Wire			
Model	Tightening torque range	Diameter	Type	Material	Temperature rating
1.25-3.5	0.59 to 0.88N•m	22 to 16AWG	Stranded	Copper	60°C or higher

(8) The master module can be connected at other points than both ends.

(9) Star connection is not allowed.

(10) The connection method is shown below.

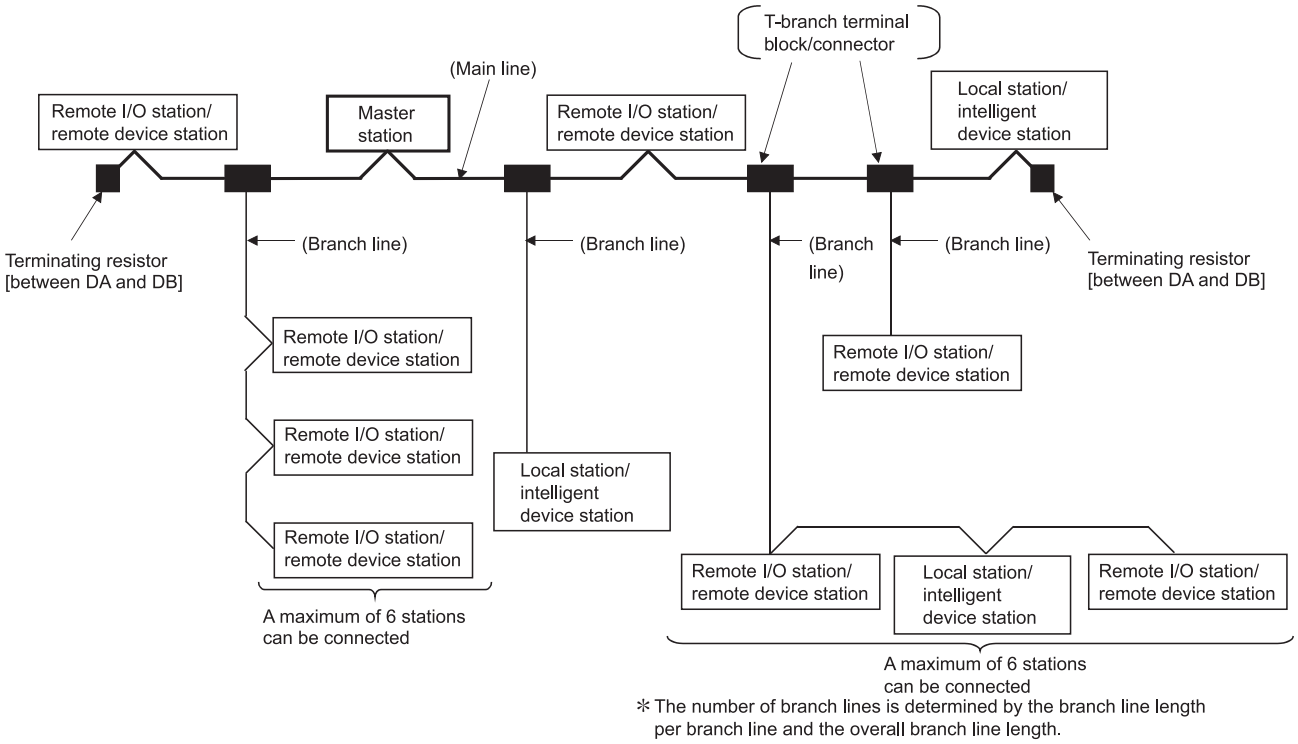


7.6 T-Branch Connection with the CC-Link Dedicated Cable

This section explains how to perform a T-branch connection using the CC-Link dedicated cable.

7.6.1 T-Branch system configuration

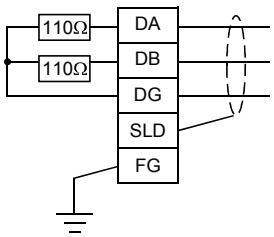
The following shows a system configuration using T-branch connection.

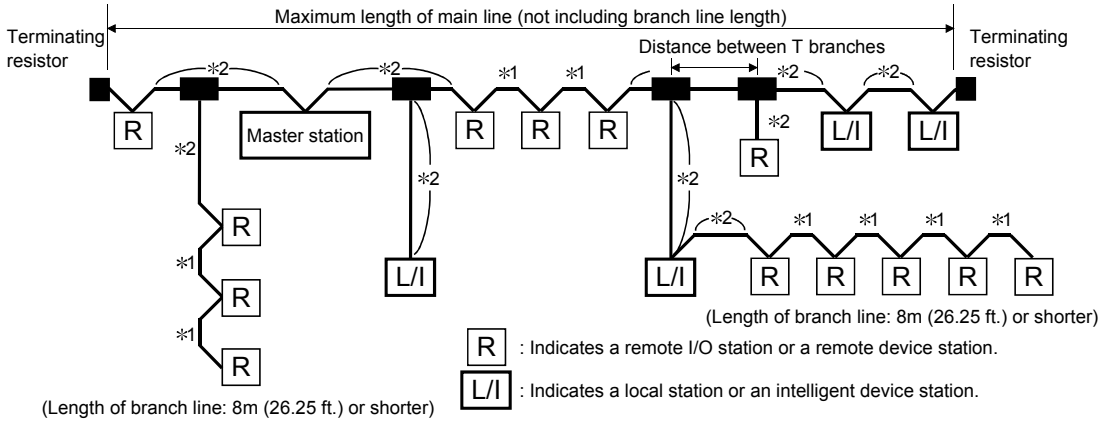


* The number of branch lines is determined by the branch line length per branch line and the overall branch line length.

7.6.2 T-Branch communication specifications list

The following describes the communication specifications for T branch connection.
For communication specifications not listed below, see Section 3.2.

Item	Specification		Remarks
Transmission speed	625 kbps	156 kbps	10 Mbps, 5 Mbps, and 2.5 Mbps are not allowed.
Maximum length of the main line	100 m (328.1 ft.)	500 m (1640.5 ft.)	Indicates the length of the cable between terminating resistors. The length of the T branch cable (branch line length) is not included.
Maximum length of the branch line	8 m (26.25 ft.)		Indicates the overall cable length per branch.
Overall branch line length	50 m (164.05 ft.)	200 m (656.2 ft.)	Indicates the overall length of the entire branch cable.
Maximum number of connected modules on the branch line	6 stations per branch		The total number of connected stations depends on the CC-Link specifications.
Connection cable	CC-Link dedicated cable Version 1.10 compatible CC-Link dedicated cable		• The CC-Link dedicated high-performance cable cannot be used. • Mixing of different brands of CC-Link dedicated cables is not allowed. • Mixing of different brands of Ver. 1.10 compatible CC-Link dedicated cables is allowed.
Terminating resistor (connection method)	When the hardware version of the master module is as follows: AJ61BT11 : Hardware version D or later AJ61QBT11 : Hardware version D or later A1SJ61BT11 : Hardware version E or later A1SJ61QBT11 : Hardware version E or later Connect the 110Ω terminating resistor supplied with the master module. For connecting, refer to Section 7.5.		• The method of connecting terminating resistors across DA and DG, and across DB and DG can be used.
	When the hardware version of the master module is other than above: 110 Ω ± 5 %, 1/2 W × 4 (Connect across DA and DG, and across DB and DG) ….both ends [Connection]  		• Use a commercially available terminating resistor of 110 Ω ± 5 % and 1/2 W resistance. • 110 Ω and 130 Ω terminating resistors supplied with the master/local modules cannot be used.
T branch terminal block/connector	• Terminal block: Off-the-shelf terminal block • Connector: Connector for FA sensor (ICE947-5-2) comparable product is recommended		• When wiring cables for the main line side, try not to remove the covering as much as possible.

<table>
<tr><th>Item</th><th>Specification</th><th>Remarks</th></tr>
<tr><td>Maximum length of main line, distance between T branches, and length of cable between stations</td><td colspan="2">CC-Link dedicated cable, Version 1.10 compatible CC-Link dedicated cable (terminating resistor 110 Ω)
<table>
<tr><th>Transmission speed</th><th>Maximum length of main line</th><th>Distance between T branches</th><th>Length of cable between the remote I/O stations or remote device stations ∗1</th><th>Length of cable between the master/local station or intelligent device station and the adjacent station (s) ∗2</th></tr>
<tr><td>625 kbps</td><td>100 m (328.1 ft.)</td><td rowspan="2">No limit</td><td rowspan="2">30 cm (11.8 in.) or longer</td><td>1 m (3.28 ft.) or longer (∗3)/
2 m (6.56 ft.) or longer (∗4)</td></tr>
<tr><td>156 kbps</td><td>500 m (1640.5 ft.)</td></tr>
</table>
∗3: The cable length of 1 m (3.28 ft.) or longer is for a system configured only with remote I/O stations and remote device stations.
∗4: The cable length of 2 m (6.56 ft.) or longer is for a system configuration that contains local stations and intelligent device stations.
 
</td><td></td></tr>
</table>

7.7 Switch Settings

The setting method for each switch on the module is described.

7.7.1 Station number setting (master station, local station, standby master station, and remote station)

The station number setting method is described for the master station, local station, standby master station, and remote station.

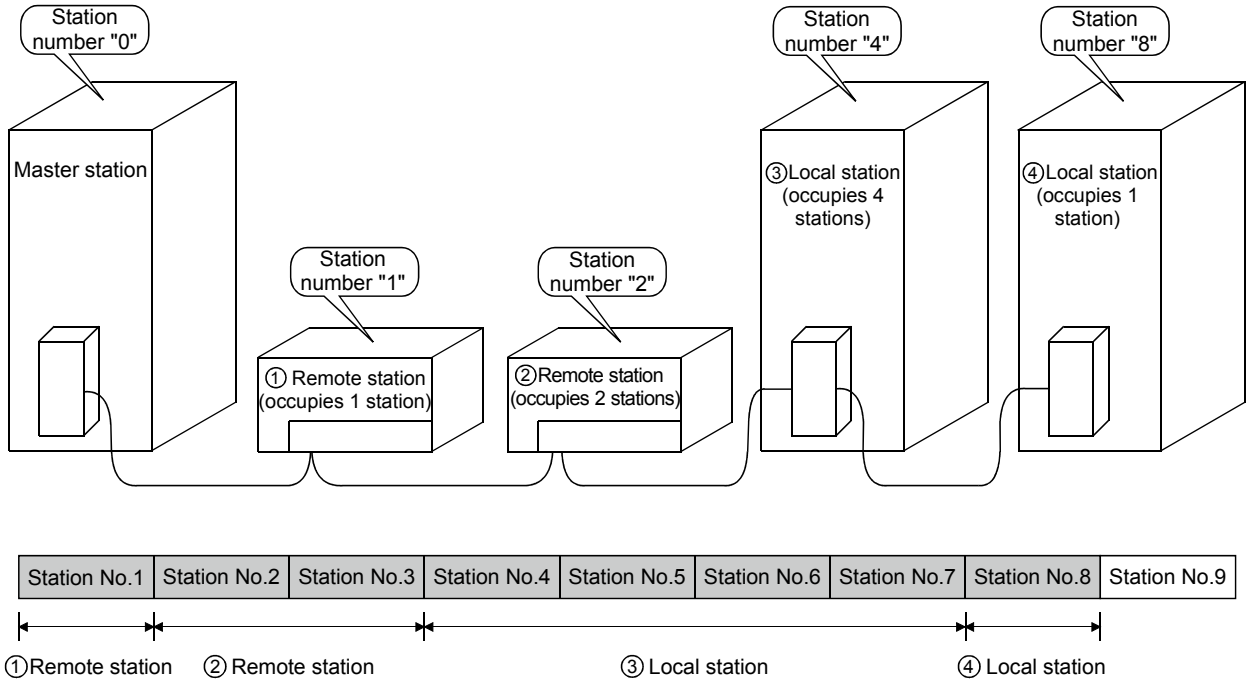
POINT
Set the data so that it matches the setting in the "station information (address 20H to 5FH)" in the parameter information area in the buffer memory.

(1) Set the station number to be consecutive.

The station number can be set regardless of the connection order.
Also, for modules that occupy more than 2 stations, set the first station number.

Station type	Station number to set
Master station	0 (Fix)
Local station	1 to 64
Standby master station	1 to 63
Remote station	1 to 64

[Setting example] When setting the station numbers in the connection order:

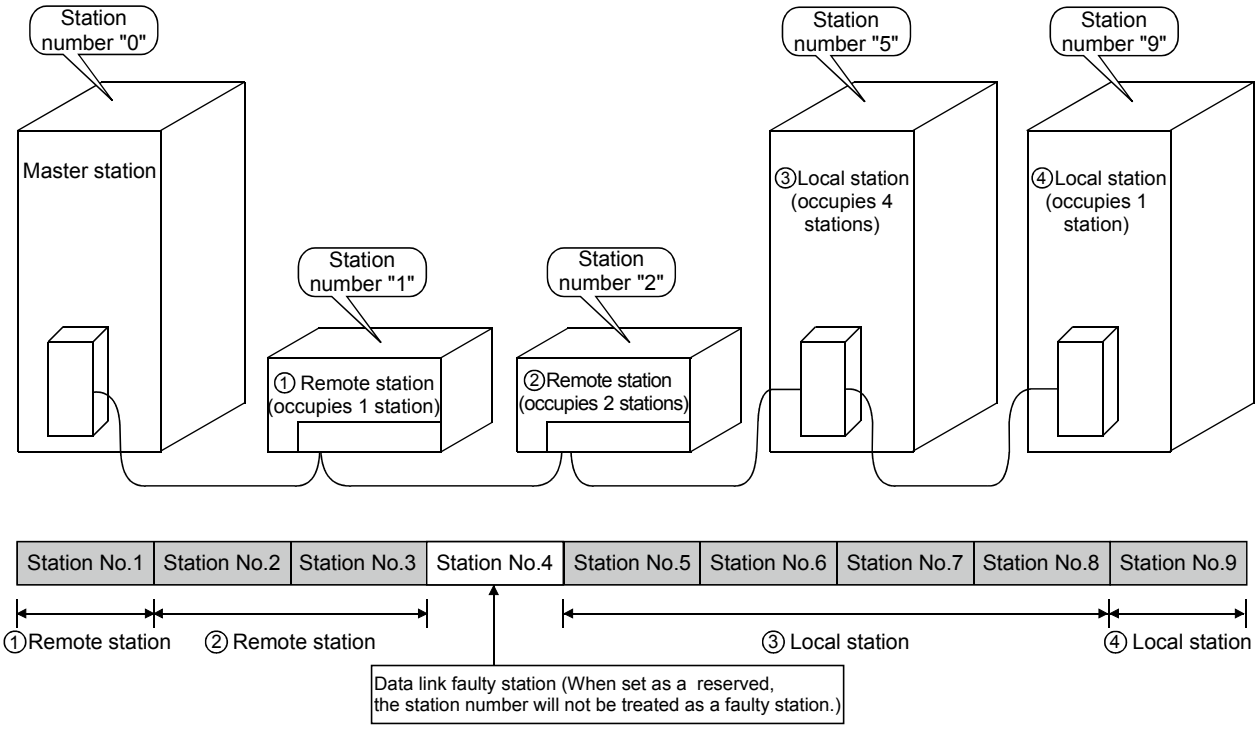


(2) Do not skip station numbers.

The skipped station number is treated as a "data-link faulty station (link special register SW0080 to 0083: can be checked with buffer memory address 680H to 683H)".

However, by setting as a reserved station, the station number will not be treated as a data-link faulty station.

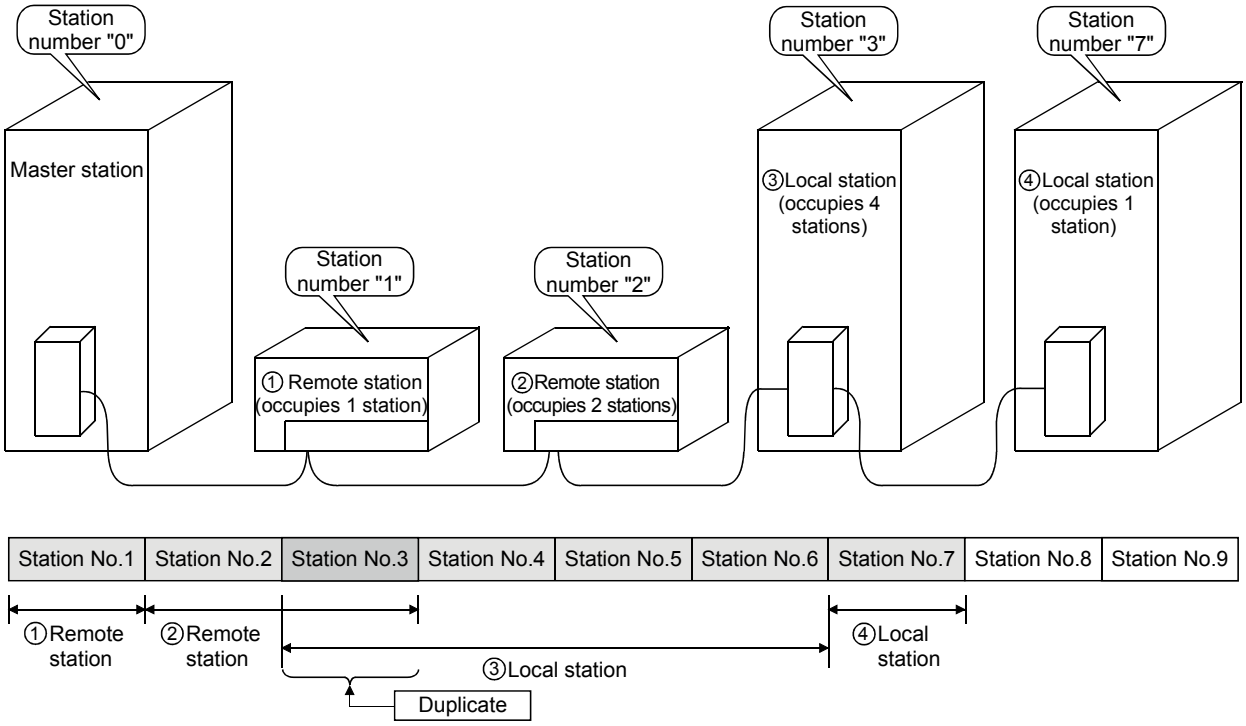
[Setting example] When a station number is skipped:



(3) There cannot be duplicate station numbers.

If there are duplicate numbers, it results in loading status error. (Error code is stored in SW0069.)

[Setting example] When a station number is duplicated:



7.7.2 Mode setting

When performing data link, "0 (online)" should be set normally.

7.7.3 Transmission speed setting

The transmission speed setting differs depending on the overall distance.
Refer to Section 3.2.1, 3.2.2 for details.

POINT
Set the same transmission speed for all of master, local, standby master, remote, and intelligent device stations. If the setting of a slave station differs from that of the master station, data link cannot be performed between them.

7.7.4 Condition setting

The setting method of the condition setting switch (DIP switch) is shown in Table 7.2.

Table 7.2 Condition setting

<table>
<tr><th rowspan="2">Number</th><th rowspan="2">Description</th><th rowspan="2" colspan="3">Switch status</th><th colspan="2">Setting</th></tr>
<tr><th>Master station</th><th>Local station</th></tr>
<tr><td>SW1</td><td>Station type</td><td colspan="3">OFF : Master/local station
ON : Standby master station</td><td>OFF (station number 0)</td><td>OFF (station number 1 to 64)</td></tr>
<tr><td>SW2</td><td>(Unusable)</td><td colspan="3">–</td><td colspan="2">Always OFF</td></tr>
<tr><td>SW3</td><td>(Unusable)</td><td colspan="3">–</td><td colspan="2">Always OFF</td></tr>
<tr><td rowspan="2">SW4</td><td rowspan="2">Input data status of the data link faulty station</td><td colspan="3" rowspan="2">OFF : Clear
ON : Hold</td><td>OFF</td><td>When setting all input data from the data-link faulty station to all off. (Refer to Section 4.9.)</td></tr>
<tr><td>ON</td><td>When keeping the input data from the data-link faulty station in the status right before the error. (Refer to Section 4.9.)</td></tr>
<tr><td rowspan="5">SW5
SW6</td><td rowspan="5">Number of occupied stations</td><td>Number of occupied stations</td><td>SW5</td><td>SW6</td><td rowspan="5" colspan="2">Setting not necessary (OFF)</td><td>–</td></tr>
<tr><td>1 station</td><td>OFF</td><td>OFF</td><td>• Remote input RX : 32 points
• Remote output RY : 32 points
• Remote register RWw : 4 points
• Remote register RWr : 4 points</td></tr>
<tr><td>2 stations ∗</td><td>OFF</td><td>ON</td><td>• Remote input RX : 64 points
• Remote output RY : 64 points
• Remote register RWw : 8 points
• Remote register RWr : 8 points</td></tr>
<tr><td>3 stations ∗</td><td>ON</td><td>ON</td><td>• Remote input RX : 96 points
• Remote output RY : 96 points
• Remote register RWw : 12 points
• Remote register RWr : 12 points</td></tr>
<tr><td>4 stations</td><td>ON</td><td>OFF</td><td>• Remote input RX : 128 points
• Remote output RY : 128 points
• Remote register RWw : 16 points
• Remote register RWr : 16 points</td></tr>
<tr><td>SW7</td><td>(Unusable)</td><td colspan="3">–</td><td colspan="2">Always OFF</td></tr>
<tr><td>SW8</td><td>(Unusable)</td><td colspan="3">–</td><td colspan="2">Always OFF</td></tr>
</table>

∗ The AJ61QBT11 of hardware version F or later and the A1SJ61QBT11 of hardware version G or later are compatible with this setting.
For other than the above, only SW5 is used to set the number of occupied stations.
OFF: 1 station occupied
ON : 4 stations occupied
Keep SW6 OFF as it is unusable.

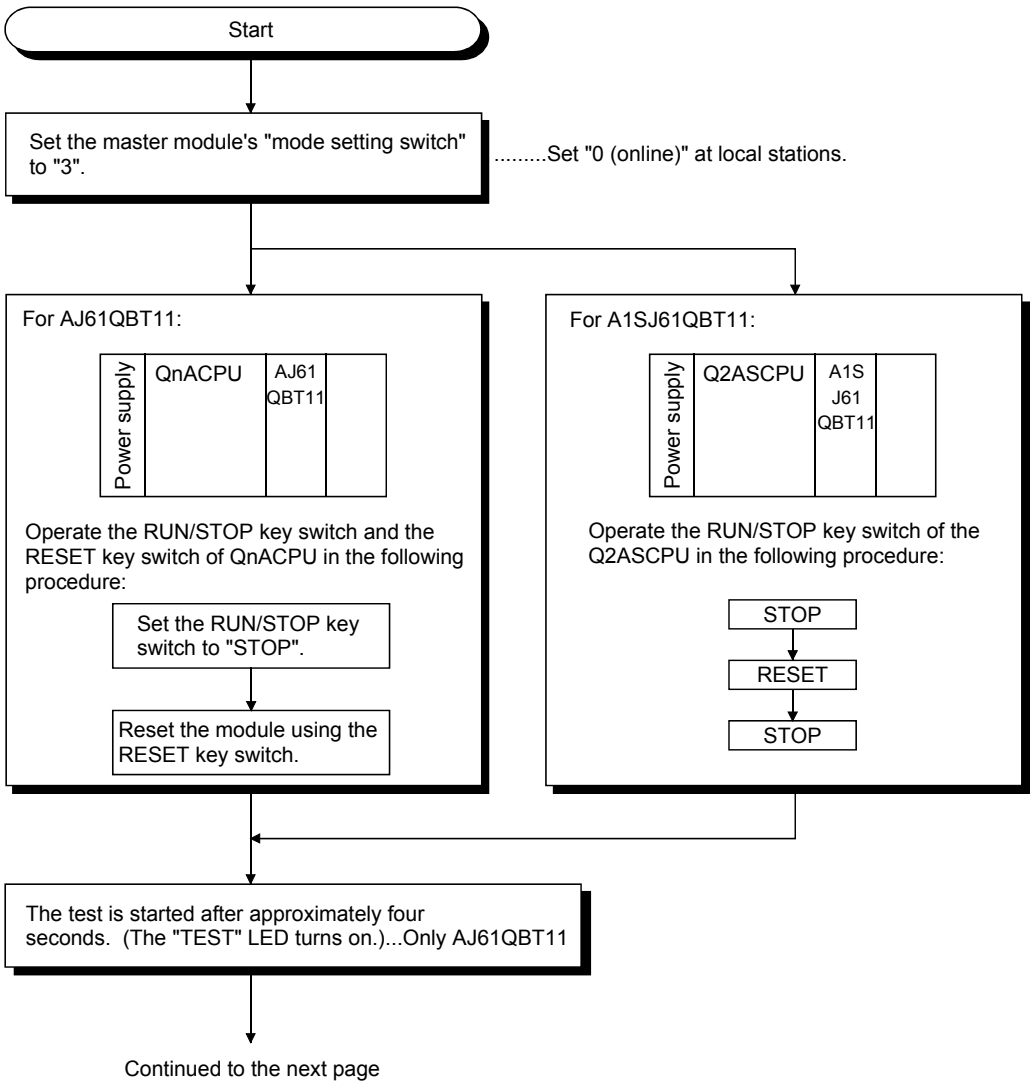
7.8 Checking the Connection Condition (Line Test)

The Line Test is performed after all modules are connected with CC-Link dedicated cables to check if the connection is correctly established to perform data link with each remote, intelligent device, local, and standby stations.

POINT
Line Test 2 is performed when an error has occurred in Line Test 1. Therefore, there is no need to perform Line Test 2 if no error was detected in Line Test 1.

7.8.1 Checking connection and communication status with remote station/local station/standby master station (line test 1)

Confirms if data link can be performed normally with all (64 stations) the remote, local, and standby master stations.
Perform Line Test by following the procedure below:



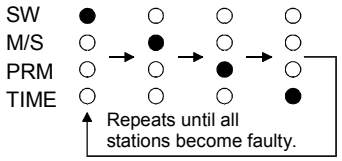
Continued from the previous page

The test results are displayed on the "LEDs" of master module.

[When at least one station is communicating normally]

The LEDs are turned on in the following order: "SW"→ "M/S"→ "PRM"→ "TIME".

The test result is stored in SW00B4 to B7. However, the test is performed for 64 stations, so ignore the bits for the unconnected stations.



LED on	Cause	Error code storage area
PRM	• All stations have error, or cable is disconnected.	SW00B8
none	• Test cannot start. (Cable is disconnected before the test, or power is off at all stations.)	———

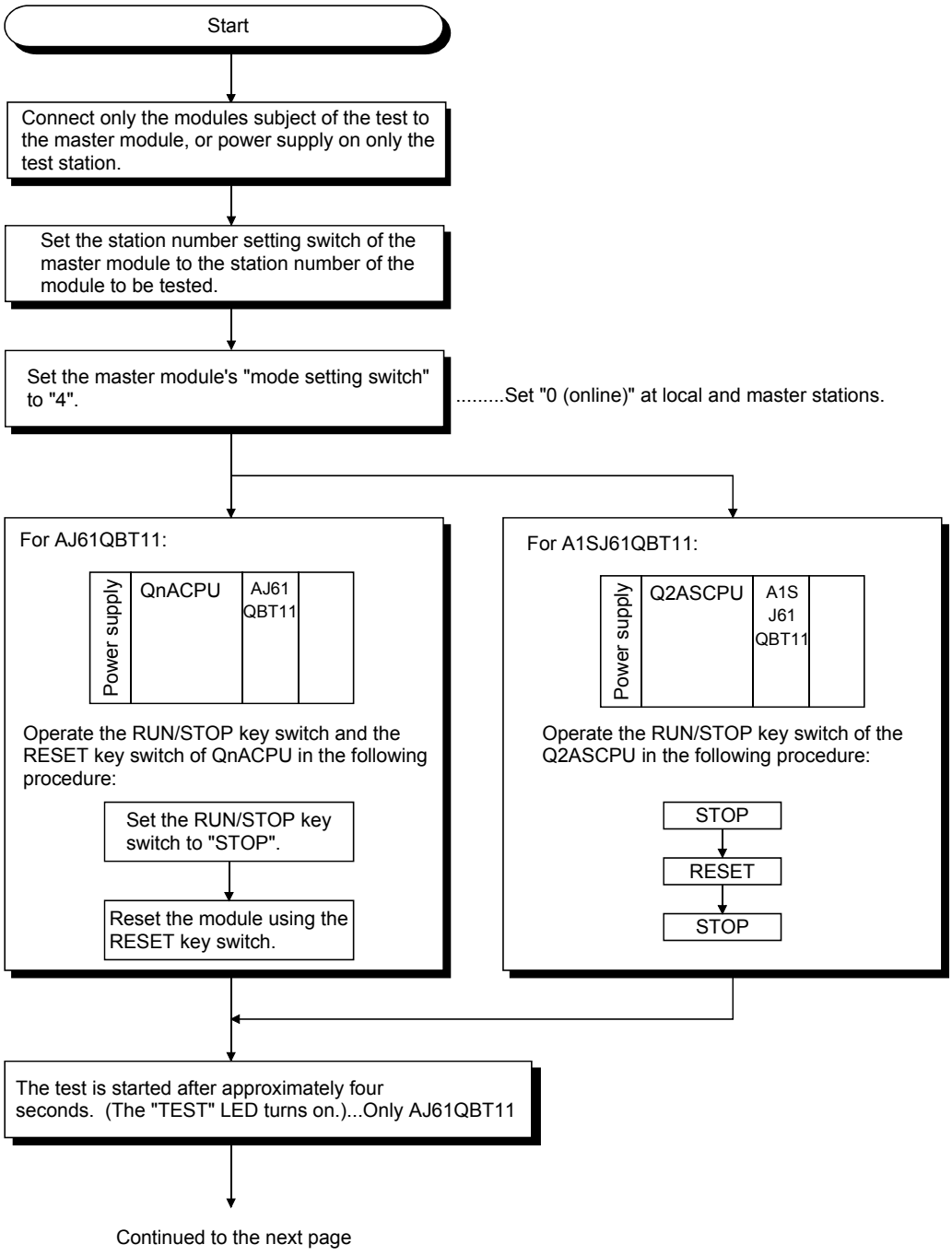
End

7.8.2 Checking communication status with specific remote station/local station/standby master station (line test 2)

Confirms if data link can be performed normally with specific remote, local, and standby master stations.

There is no need to set parameters.

Perform Line Test 2 by following the procedure below:

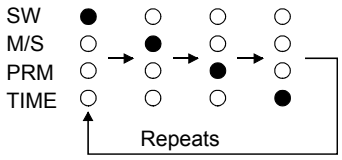


Continued from the previous page

The test results are displayed on the "LEDs" of master module.

[When normal]

The LEDs are turned on in the following order: "SW"→"M/S"→"PRM"→"TIME".
It is judged as normal when this repeats five times or more.



[When error]

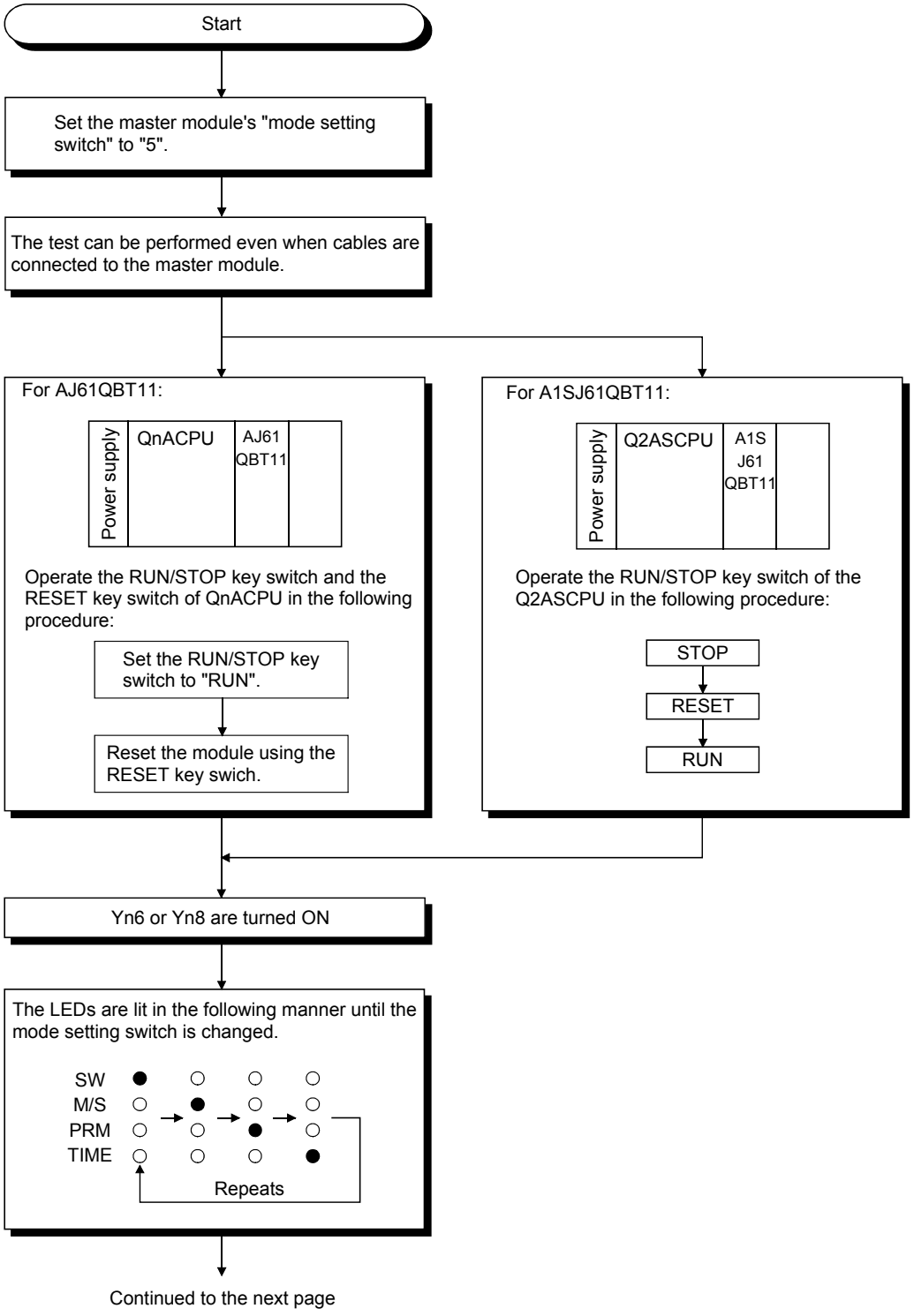
LED on	Cause	Error code storage area
PRM	• Cable is disconnected, or the corresponding station has error. • Test transmission text is corrupt.	SW00B8
none	• Test cannot start. (Cable is disconnected before the test, or power is off at all stations.)	—

End

7.9 Checking Parameters (Parameter Confirmation Test)

Contents of the parameters registered in the master module's E^2PROM can be confirmed.

Perform the test by following the procedure below:



Continued from the previous page

The test results are displayed on the "LEDs" of master module.
By switching the mode setting switch, the parameter content corresponding to each mode number is displayed on LED.

Mode setting switch	Parameter item	Used LEDs and contents
0	Total number of stations	Tens digit: MST, S MST, LOCAL Units digit: SW, M/S, PRM, TIME
1	Number of linked modules	
2	Number of retries	MST ○ · · · · · · 40 S SMT ○ · · · · · · 20 LOCAL ○ · · · · · · 10 SW ○ · · · · · · 8 M/S ○ · · · · · · 4 PRM ○ · · · · · · 2 TIME ○ · · · · · · 1 When 26 MST ○ S SMT ● LOCAL ○ SW ○ M/S ● PRM ● TIME ○
3	(Unusable)	
4	Reserved station specification	SW (off: no specification, on: specification exists)
5	Invalid station specification	SW (off: no specification, on: specification exists)
6	Station type*1 *2	SW: remote I/O station M/S: remote device station PRM: local station, standby master station, and intelligent device station
7	Number of occupied stations*1 *2	SW: 1 station M/S: 2 stations PRM: 3 stations TIME: 4 stations
8	Station number*1	Tens digit: MST, S MST, LOCAL Units digit: SW, M/S, PRM, TIME MST ○ · · · · · · 40 S SMT ○ · · · · · · 20 LOCAL ○ · · · · · · 10 SW ○ · · · · · · 8 M/S ○ · · · · · · 4 PRM ○ · · · · · · 2 TIME ○ · · · · · · 1 When 26 MST ○ S SMT ● LOCAL ○ SW ○ M/S ● PRM ● TIME ○
9 to F	(Unusable)	

*1: Set the module's station number by the station number setting switch.
*2: For modules that occupy more than two stations, the same LED details are displayed for the number of occupied stations.

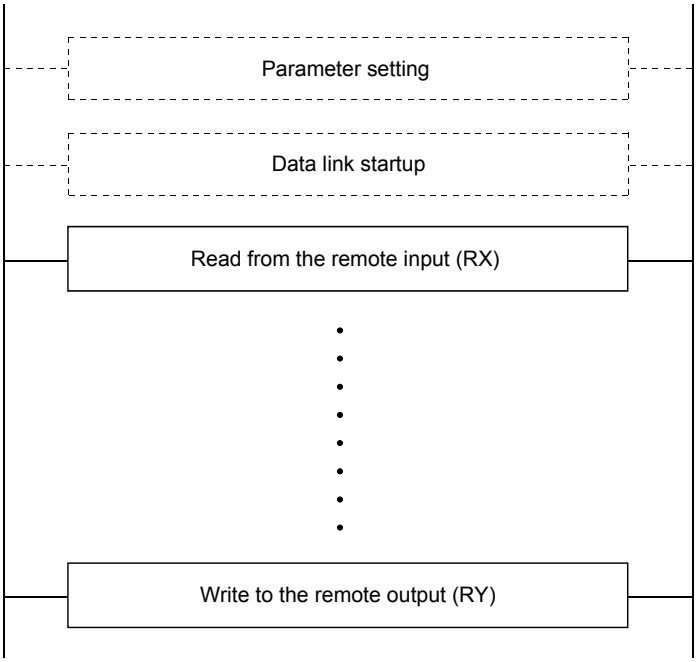
End

8. PROGRAMMING

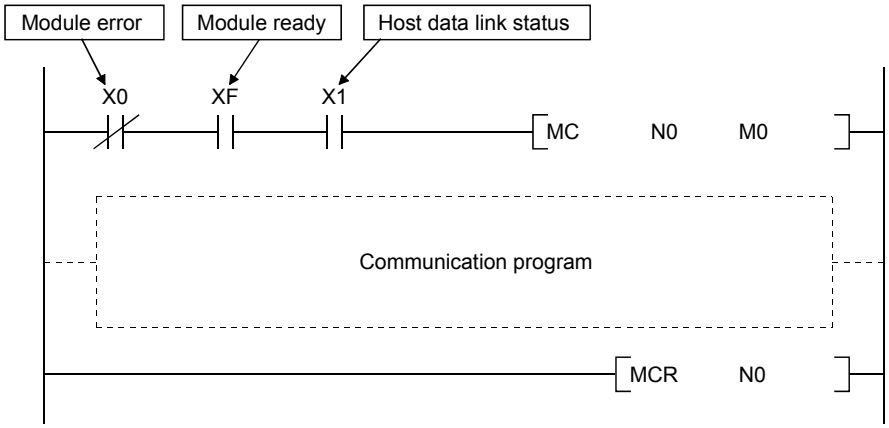
8.1 Precautions When Programming

Precautions when creating programs are described below:

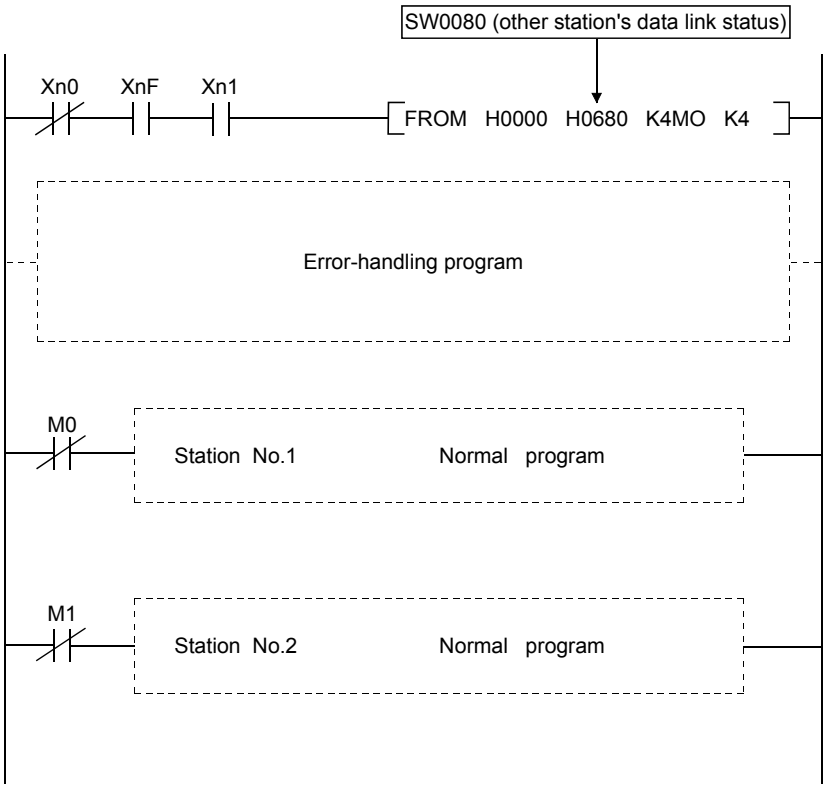
(1) Create a read program from the remote input RX (address E0H to 15FH) after data link is started.
Also, create a write program to the remote output RY (address 160H to 1DFH) at the last of the entire program.



(2) In a program, reading received data and writing transmission data should be performed after the host station becomes the data link status (Xn1 is on).



(3) Create a program which checks and interlooks the data-link status at remote I/O station, remote device station and local station.
Also, create an error-handling program.



8.2 Precautions for Registering Parameters to E^2PROM

This section explains the precautions for registering parameters to E^2PROM.
This section may be read by only those who will use the module indicated in Section 8.2.1 and register parameters to E^2PROM more than 127 times without switching power off or resetting the CPU.
The number of times when parameters can be registered to E^2PROM is cleared by switching power off or resetting the CPU.

8.2.1 Target module and versions

The target module and versions are as indicated below.

Target Module	Hardware version	Software version
A1SJ61QBT11	H or later	E (manufactured in Aug., 2001) or later

8.2.2 Precautions

The following are the precautions for registering parameters to E^2PROM.

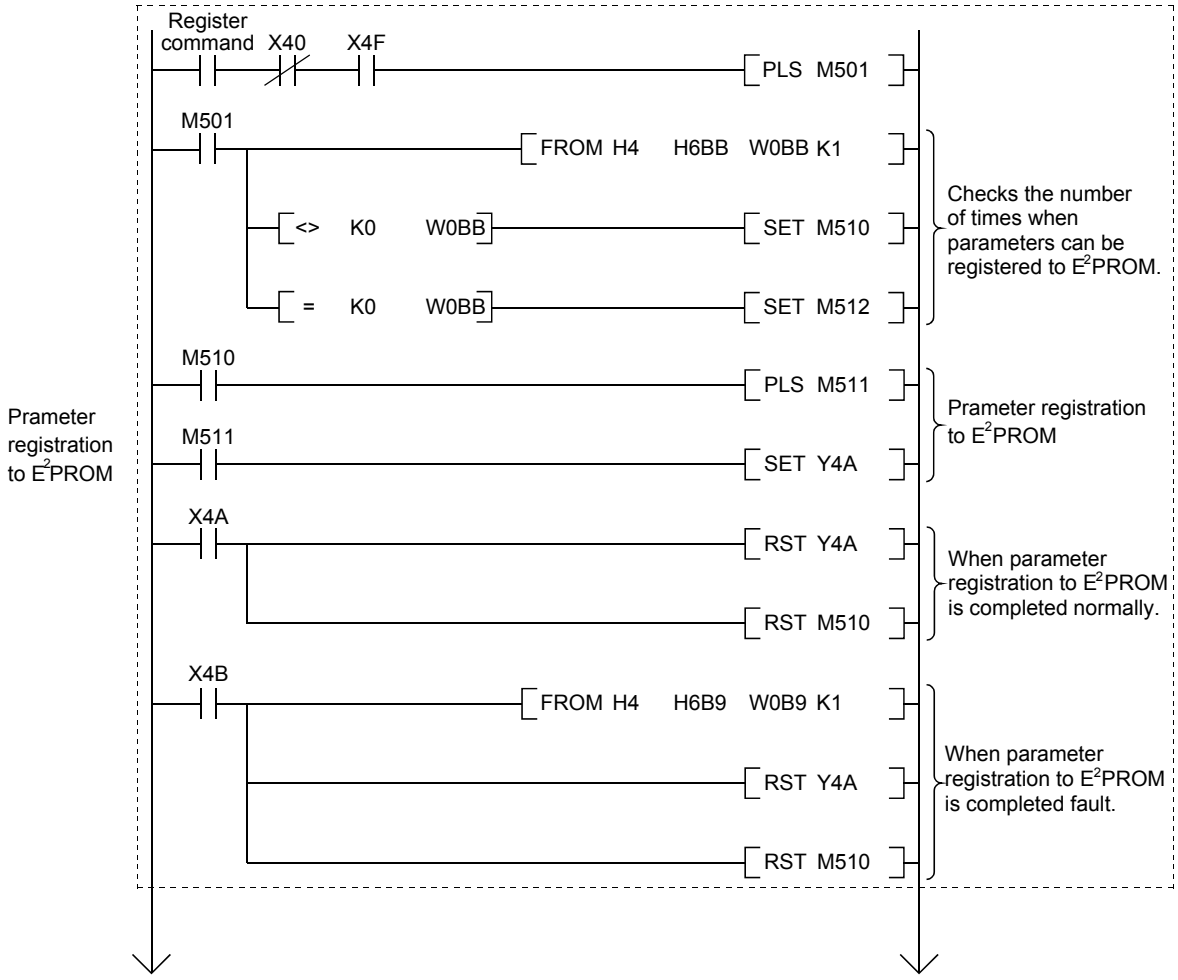
(1) The number of times when parameters can be registered to E^2PROM consecutively without switching power off or resetting the CPU is up to 127.

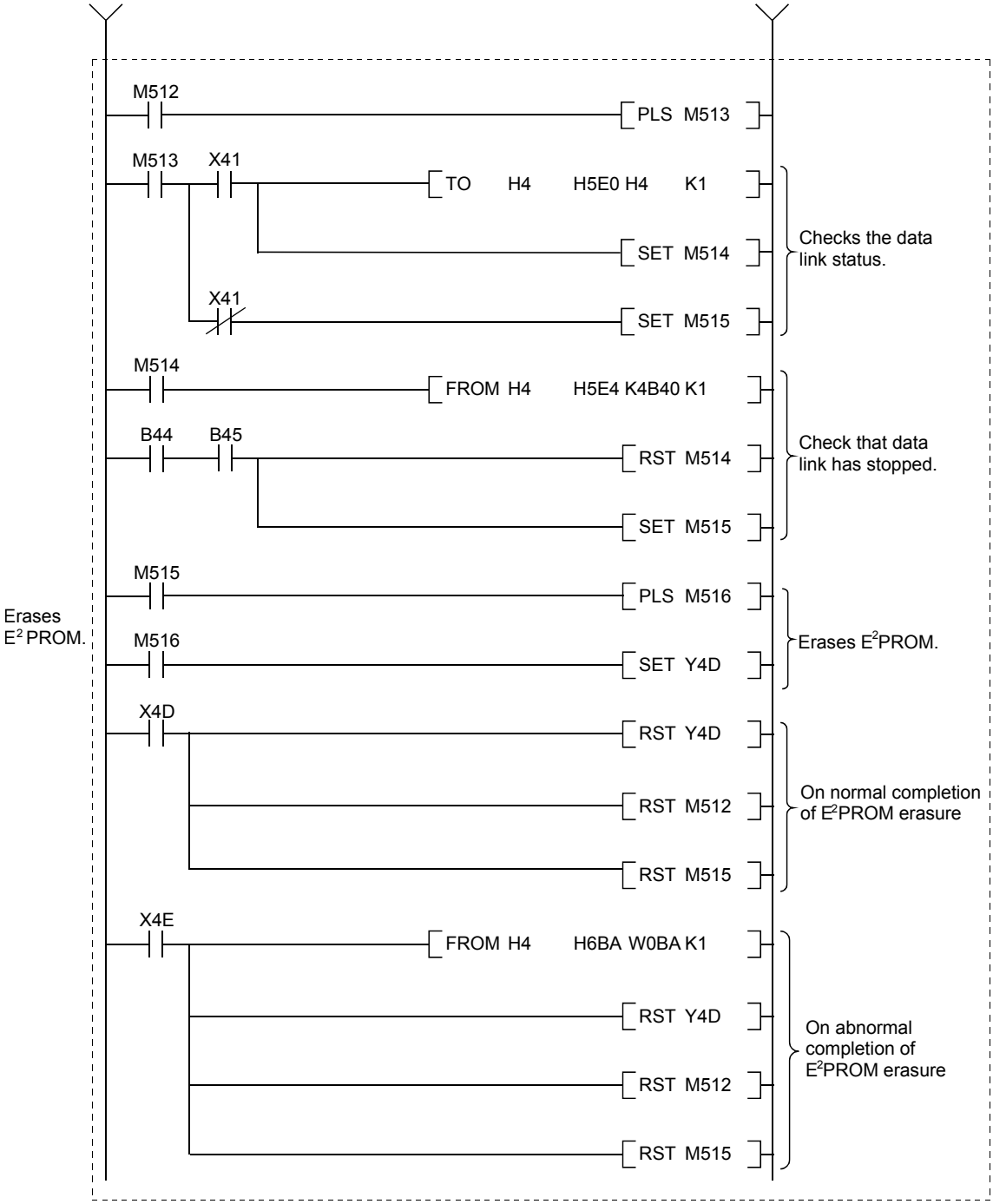
(2) The link special register (SW00BB) stores the number of times when parameters can be registered to E^2PROM.

(3) When the number of times when parameters can be registered to E^2PROM is zero, turn on the E^2PROM erasure request (YnD) after a data link stop to erase the parameters in the E^2PROM.

8.2.3 Program for registering parameters to E^{2}PROM

The program for registering parameters to E^{2}PROM is shown below.
This example assumes that the master module is installed to the head I/O number 40.



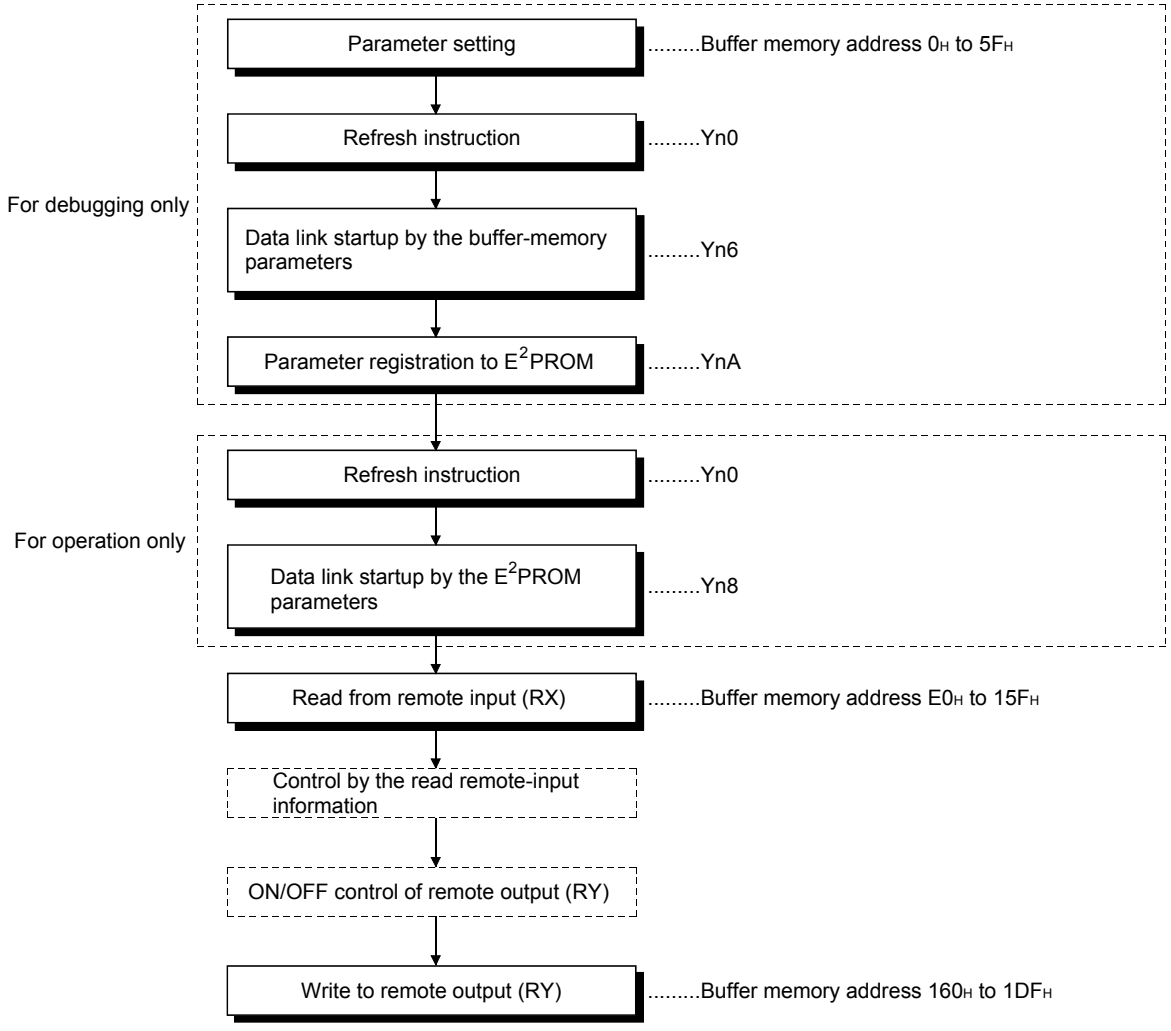

Erases E2 PROM.
M512
PLS M513
M513 X41
TO H4 H5E0 H4 K1
SET M514
X41
SET M515
Checks the data link status.
M514
FROM H4 H5E4 K4B40 K1
B44 B45
RST M514
SET M515
Check that data link has stopped.
M515
PLS M516
M516
SET Y4D
Erases E2PROM.
X4D
RST Y4D
RST M512
RST M515
On normal completion of E2PROM erasure
X4E
FROM H4 H6BA W0BA K1
RST Y4D
RST M512
RST M515
On abnormal completion of E2PROM erasure

8.3 Programming Procedure

The procedure for creating a program is described.

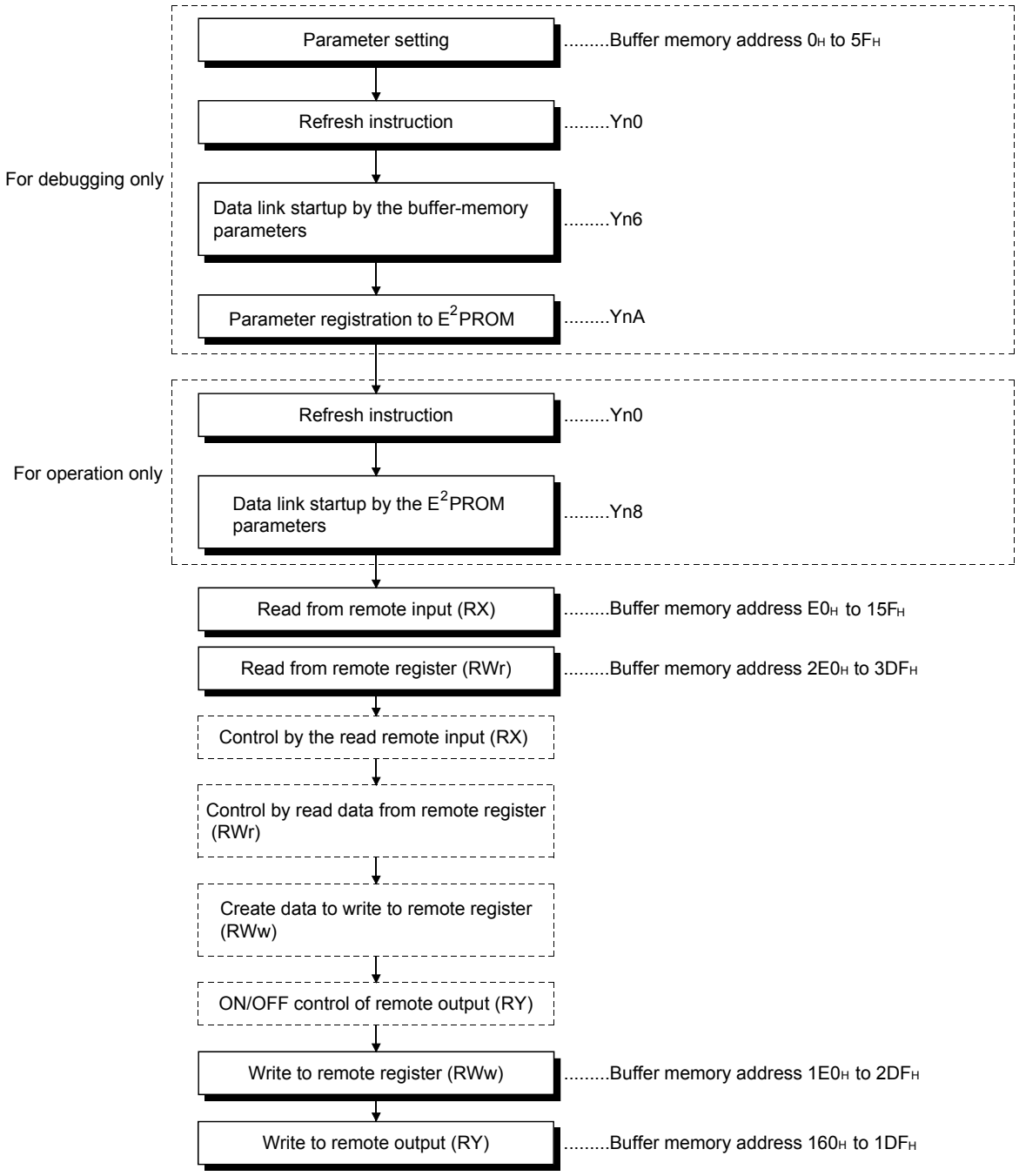
8.3.1 Communication between the master station and remote I/O station

The basic procedure for creating a program to communicate with remote I/O station is shown below.
Refer to Chapter 9 for a program example.



8.3.2 Communication between the master station and remote device station

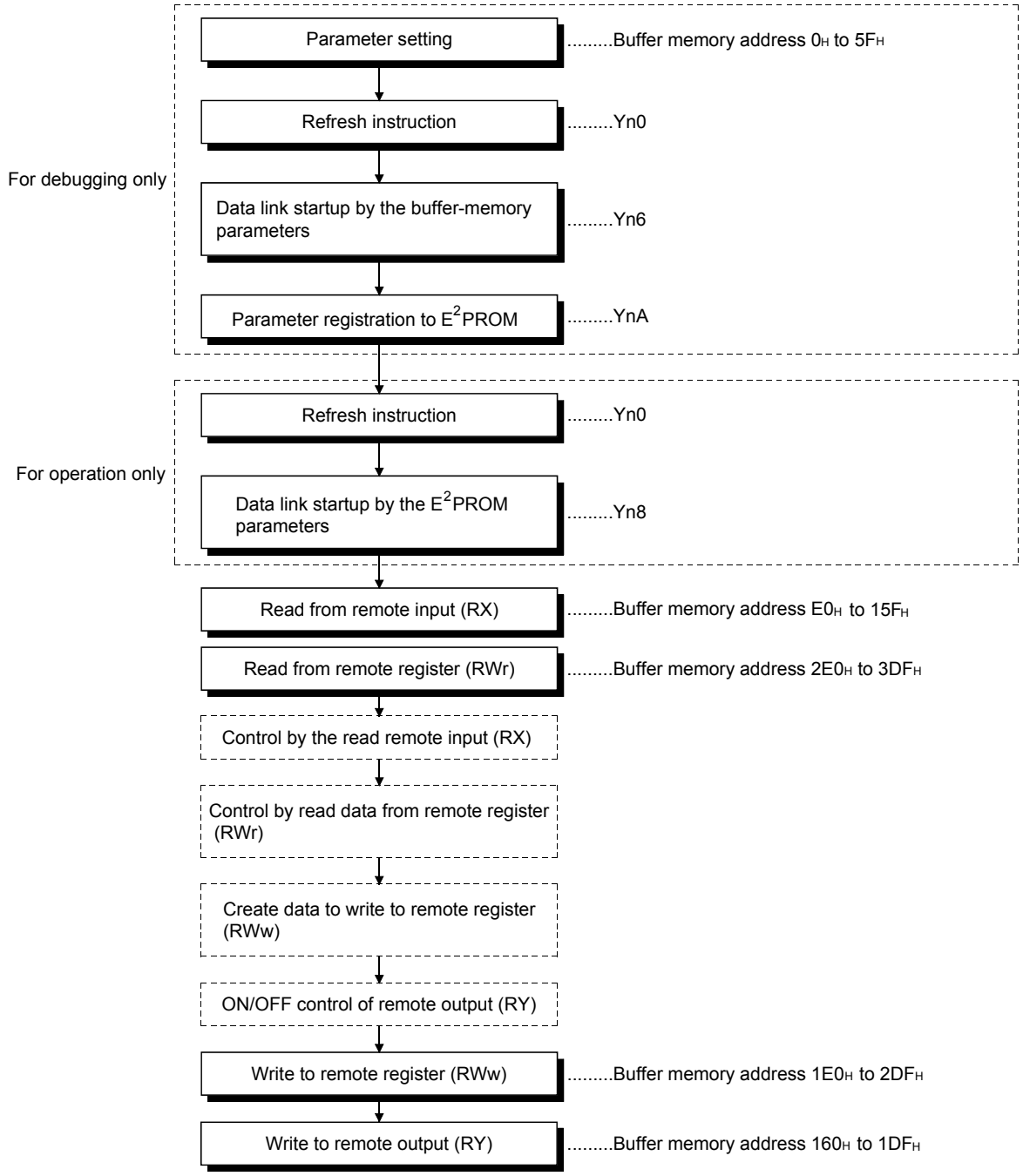
The basic procedure for creating a program to communicate with remote device station is shown below.
Refer to Chapter 10 for a program example.



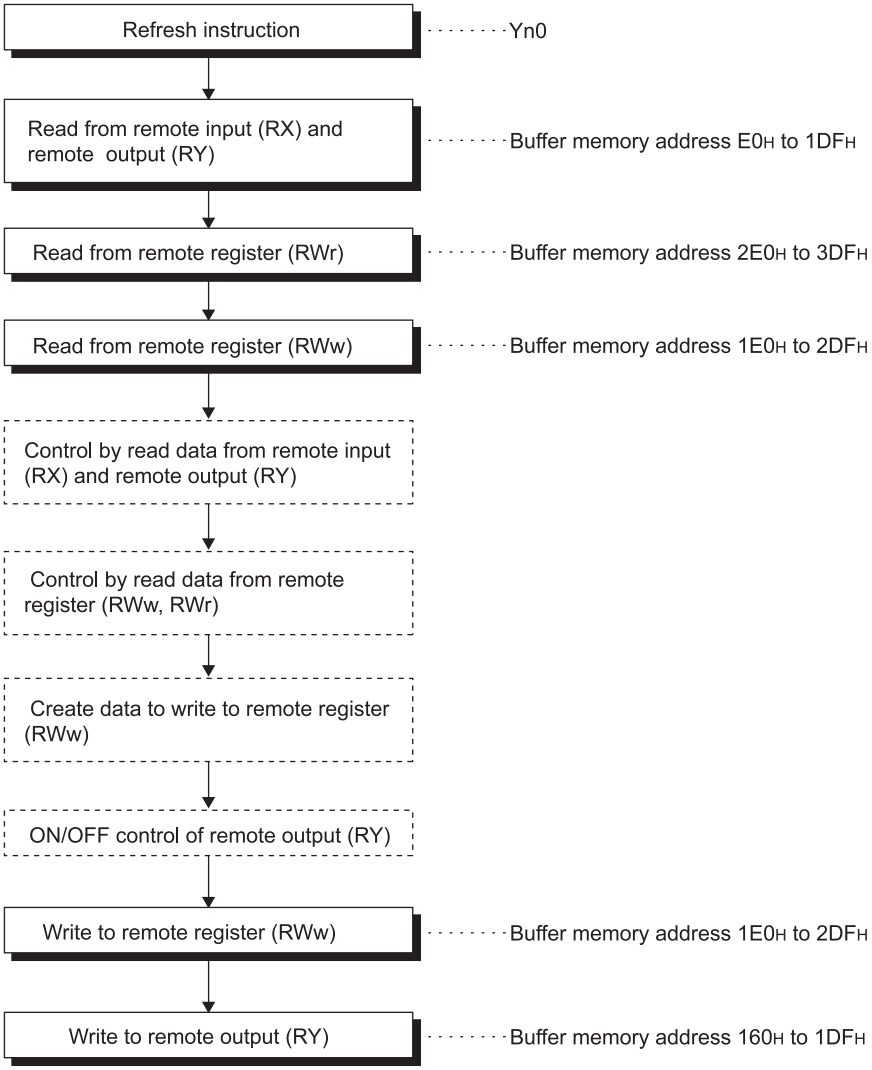
8.3.3 Communication between the master station and local station

The basic procedure for creating a program to communicate with local station is shown below.
Refer to Chapter 11 for a program example.

(1) Master station



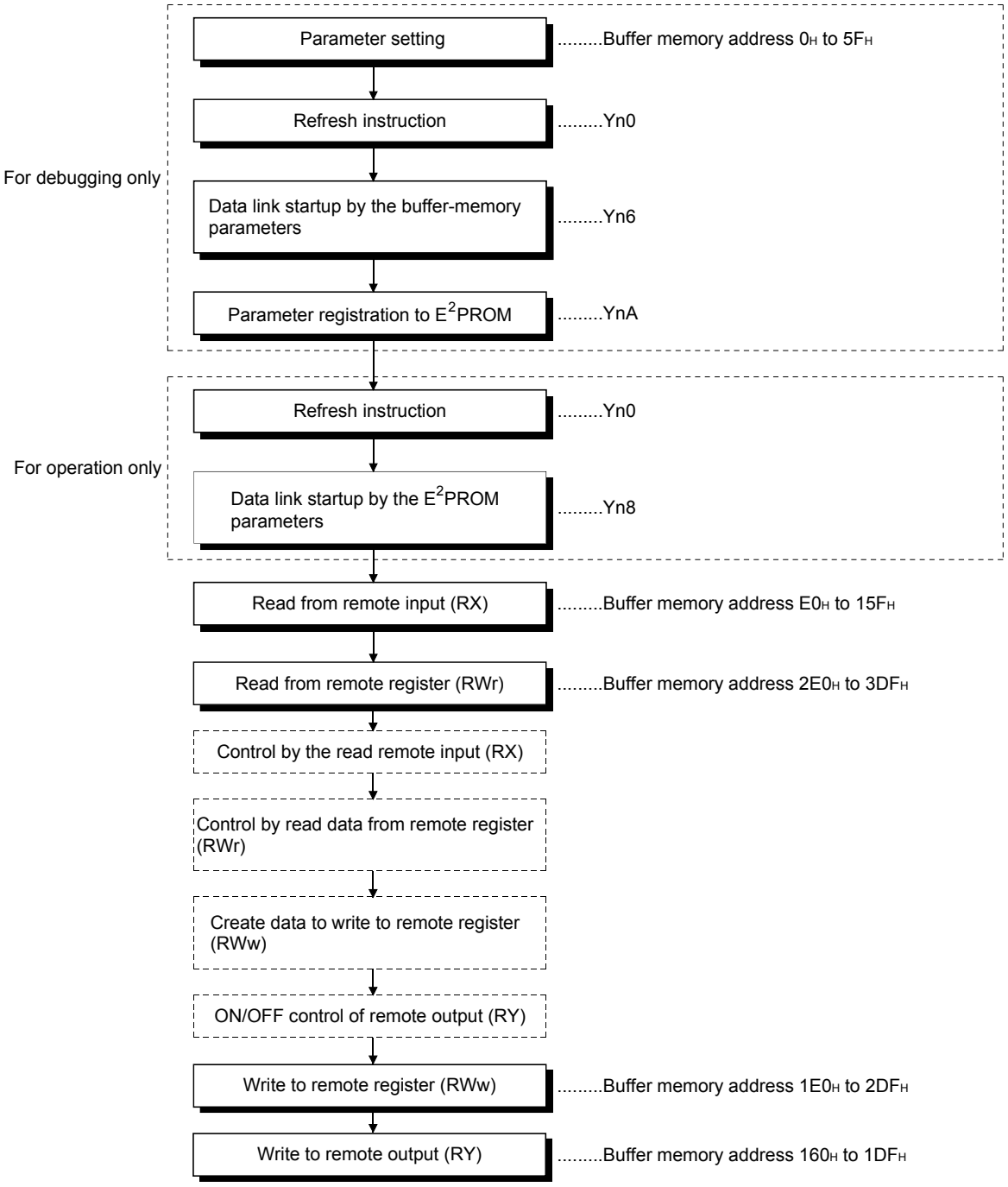
(2) Local station



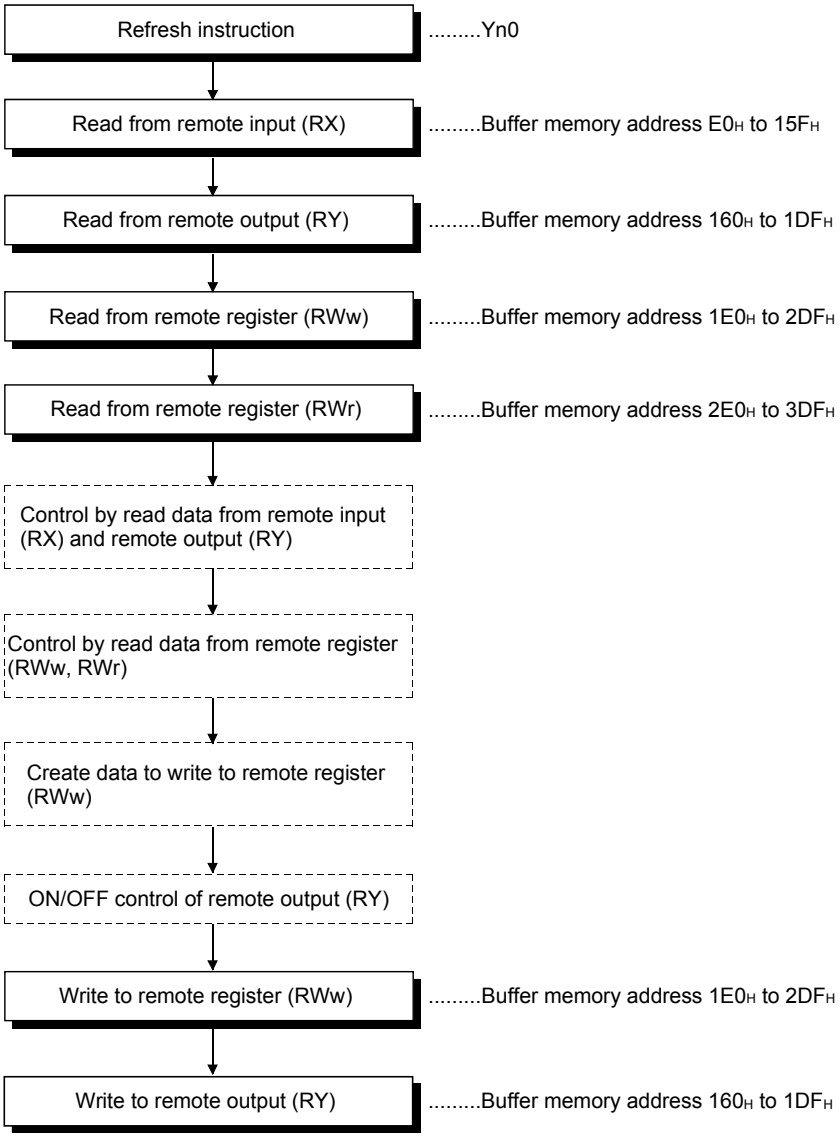
8.3.4 Communication in a compound system

The basic procedure for creating a program to remote I/O, remote device and local stations is shown below.
Refer to Chapter 12 for a program example.

(1) Master station



(2) Local station



8.4 Link Special Relay/Register (SB/SW)

The data link status can be checked with bit data (link special relay SB) and word data (link special register SW).
The SB and SW are used to conveniently express the information on the buffer memory of the master and local modules. They are read and written before use with FROM/TO instructions.

- Link special relay (SB)..... Buffer memory address 5E0H to 5FFH
- Link special register (SW) ..... Buffer memory address 600H to 7FFH

8.4.1 Link special relay (SB)

SB0000 to SB002F is turned on/off with the sequence program, and SB0030 to SB00FF is automatically turned on/off.
Refer to Section 3.5.2 (4) for correspondence with buffer memory.
When using a master/local module as a standby master station, refer to the respective columns under "Availability" in the table as explained below.

- When a standby master station is operating as a master station: "Master station" column
- When a standby master station is operating as a standby master station: "Local station" column

Table 8.1 Link special relay list

Number	Name	Description	Availability (○ : available, × : not available)		
			Online		Offline
			Master station	Local station	
SB0000	Data link restart	When parameter data change is not made to the data link which was stopped by SB0002, restart it with this signal. (If you have changed parameter data during a data link stop, turn on Yn6 and Yn8 to restart a data link.) OFF : No restart specification ON : Restart specification	○	○	×
SB0001 ∗1	Master station switching data link start	The output information is switched from the standby master station to the master station to start the data link (Usable in standby master station). OFF : No switch instruction ON : Switch instruction	×	×	×
SB0002	Data link stop	Stops the host station's data link. However, when the master station executes this, the entire system stops. OFF : No stop specification ON : Stop specified	○	○	×
SB0004 ∗1	Temporary error invalid station request	Confirms the station which had been specified by SW0003 to SW0007 to temporary error invalid station. OFF : No request ON : Request	○	×	×
SB0005 ∗1	Temporary error invalid station cancelling request	Cancels the station which had been specified by SW0003 to SW0007 from temporary error invalid station. OFF : No request ON : Request	○	×	×
SB0008 ∗1	Line test request	Performs the line test to station which had been specified by SW0008. OFF : No request ON : Request	○	×	×
SB0009 ∗1	Parameter setting test request	Reads the parameter setting information for actual system configuration. OFF : Requested ON : Not requested	○	×	×

∗1: Link special relay added to the function version B or later

Table 8.1 Link special relay list (continued)

Number	Name	Description	Availability (○ : available, × : not available)		
			Online		Offline
			Master station	Local station	
SB0020 ＊1	Module status	Stores the status of communications between the master/local module and the CPU module. OFF : Normal ON : Error	○	○	○
SB0030 ＊2	Communication instruction (1) acceptance	Indicates the acceptance status of SEND/RECV/READ/WRITE/REQ instructions (when channel 1 is used).(Usable on AJ61QBT11 and A1SJ61QBT11) OFF : Not accepted ON : Accepted	○	○	×
SB0031 ＊2	Communication instruction (1) complete	Indicates the complete status of SEND/RECV/READ/WRITE/REQ instructions (when channel 1 is used). (Usable on AJ61QBT11 and A1SJ61QBT11) OFF : Not completed ON : Completed	○	○	×
SB0032 ＊2	Communication instruction (2) acceptance	Indicates the acceptance status of SEND/RECV/READ/WRITE/REQ instructions (when channel 2 is used). (Usable on AJ61QBT11 and A1SJ61QBT11) OFF : Not accepted ON : Accepted	○	○	×
SB0033 ＊2	Communication instruction (2) complete	Indicates the complete status of SEND/RECV/READ/WRITE/REQ instructions (when channel 2 is used). (Usable on AJ61QBT11 and A1SJ61QBT11) OFF : Not completed ON : Completed	○	○	×
SB0040	Data link restart acceptance	Indicates data link restart specification acceptance status. OFF : Not accepted ON : Startup specification accepted	○	○	×
SB0041	Data link restart complete	Indicates data link restart specification acceptance complete status. OFF : Not complete ON : Startup complete	○	○	×
SB0042 ＊1	Master station switch data link start acceptance	Indicates the acceptance status of data link start switch instruction from the standby master station to the master station (Usable on the standby master station). OFF : Not accepted ON : Accepted	×	×	×
SB0043 ＊1	Master station switch data link start complete	Indicates the acceptance status of data link start switch instruction from the standby master station to the master station (Usable on the standby master station). OFF : Not Instruction ON : Completed	×	×	×
SB0044	Data link stop acceptance	Indicates data link stop specification acceptance status. OFF : Not accepted ON : Stop specification accepted	○	○	×
SB0045	Data link stop complete	Indicates data link stop specification acceptance complete status. OFF : Not complete ON : Stop complete	○	○	×
SB0048 ＊1	Temporary error invalid station acceptance	Indicates the acceptance status of the temporary error invalid station request instruction. OFF : Not accepted ON : Accepted	○	×	×
SB0049 ＊1	Temporary error invalid station complete status	Indicates the acceptance complete status of the temporary error invalid station request instruction. OFF : Not executed ON : Temporary error invalid station confirmed	○	×	×
SB004A ＊1	Temporary error invalid station cancelling acceptance status	Indicates the acceptance status of the temporary error invalid station cancelling request instruction. OFF : Not executed ON : Instruction accepted	○	×	×
SB004B ＊1	Temporary error invalid station cancelling complete status	Indicates the acceptance complete status of the temporary error invalid station cancelling request instruction. OFF : Not executed ON : Temporary error invalid station cancelling complete	○	×	×

＊1: Link special relay added to the function version B or later
＊2: Link special relay added to the software version J or later

Table 8.1 Link special relay list (continued)

<table>
<tr><th rowspan="3">Number</th><th rowspan="3">Name</th><th rowspan="3">Description</th><th colspan="3">Availability
(○ : available,
× : not available)</th></tr>
<tr><th colspan="2">Online</th><th rowspan="2">Offline</th></tr>
<tr><th>Master station</th><th>Local station</th></tr>
<tr><td>SB004C＊1</td><td>Line test acceptance status</td><td>Indicates the line test request acceptance status.
OFF : Not executed
ON : Specification accepted</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SB004D＊1</td><td>Line test complete status</td><td>Indicates the line test complete status.
OFF : Not completed
ON : Test complete</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SB004E＊1</td><td>Parameter setting test acceptance status</td><td>Indicates the parameter setting test request acceptance status.
OFF : Not accepted
ON : Specification accepted</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SB004F＊1</td><td>Parameter setting test complete status</td><td>Indicates the parameter setting test complete status.
OFF : Not completed
ON : Test complete</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SB0050</td><td>Offline test status</td><td>Indicates the offline-test execution status.
OFF : Not executed
ON : In progress</td><td>×</td><td>×</td><td>○</td></tr>
<tr><td>SB0060</td><td>Mode</td><td>Indicates the module's mode setting switch setting status.
OFF : Online (0)
ON : Other than online (0)</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>SB0061</td><td>Station type</td><td>Indicates the setting status of the module station number setting switch.
OFF : Master station (station number 0)
ON : Local station (station numbers 1 to 64)</td><td>○</td><td>○</td><td>×</td></tr>
<tr><td>SB0062＊1</td><td>Standby master station setting</td><td>Indicates the setting status of the standby master station.
OFF : Not set
ON : Set</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SB0065</td><td>Input data status of a data link error station</td><td>Indicates the setting status of the module's condition setting switch (DIP switch) SW4.
OFF : Clear
ON : Keep</td><td>○</td><td>○</td><td>×</td></tr>
<tr><td>SB0066
SB0067＊2</td><td>Number of occupied stations</td><td>Indicates the setting of the module's condition setting switch (DIP switch) SW5, SW6.
<table>
<tr><th>Number of occupied stations</th><th>SB0066 (SW5)</th><th>SB0067 (SW6)</th></tr>
<tr><td>1 station</td><td>OFF</td><td>OFF</td></tr>
<tr><td>2 stations</td><td>OFF</td><td>ON</td></tr>
<tr><td>3 stations</td><td>ON</td><td>ON</td></tr>
<tr><td>4 stations</td><td>ON</td><td>OFF</td></tr>
</table></td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>SB0069</td><td>Module mode</td><td>Indicates the setting status of the module's condition setting switch (DIP switch) SW8. (Usable on AJ61BT11 and A1SJ61BT11)
OFF : Intelligent mode
ON : I/O mode</td><td>○</td><td>○</td><td>×</td></tr>
<tr><td>SB006A</td><td>Switch setting status</td><td>Indicates the switch setting status.
OFF : Normal
ON : Setting error exists (Store the error code in SW006A)</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>SB006D</td><td>Parameter setting status</td><td>Indicates the parameter setting status.
OFF : Normal
ON : Setting error exists (Store the error code in SW0068)</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SB006E</td><td>Host station operation status</td><td>Indicates the data link communication status with other stations.
OFF : In operation
ON : Not in operation</td><td>○</td><td>○</td><td>×</td></tr>
<tr><td>SB0070＊1</td><td>Master station data link status</td><td>Indicates data link status.
OFF : Data link for master station
ON : Data link for waiting master station</td><td>○</td><td>○</td><td>×</td></tr>
<tr><td>SB0071＊1</td><td>Standby master station information</td><td>Indicates whether there is standby master station or not.
OFF : Not present
ON : Present</td><td>○</td><td>○</td><td>×</td></tr>
<tr><td>SB0072＊1</td><td>Scan mode setting</td><td>Indicates the scan mode setting status.
OFF : Asynchronous mode
ON : Synchronous mode</td><td>○</td><td>×</td><td>×</td></tr>
</table>

＊1: Link special relay added to the function version B or later

＊2: Link special relay added to the AJ61QBT11 of hardware version F or later and the A1SJ61QBT11 of hardware version G or later

Table 8.1 Link special relay list (continued)

Number	Name	Description	Availability (○ : available, × : not available)		
			Online		Offline
			Master station	Local station	
SB0073	Operation specification when CPU is down status	Indicates specification when CPU is down status by parameter. OFF : Stop ON : Continue	○	×	×
SB0074	Reserved station specified status	Indicates the reserved station specified status by parameters (SW0074 to SW0077). OFF : No specification ON : Specification exists Depending on the refresh timing, this relay may be updated with the difference of one sequence scan from the update of Reserved station specified status (SW0074 to SW0077).	○	○	×
SB0075	Error invalid station specified status	Indicates the error invalid station specified status by parameters (SW0078 to SW007B). OFF : No specification ON : Specification exists Depending on the refresh timing, this relay may be updated with the difference of one sequence scan from the update of Error invalid station specified status (SW0078 to SW007B).	○	○	×
SB0076 ∗1	Temporary error invalid station setting information	Indicates the setting of yes/no for temporary error invalid station. OFF : No ON : Yes Depending on the refresh timing, this relay may be updated with the difference of one sequence scan from the update of Temporary error invalid station specified status (SW007C to SW007F).	○	○	×
SB0077	Parameter receive status	Indicates the parameter receive status from the master station. OFF : Receive complete ON : Receive not complete	×	○	×
SB0078 ∗1	Host station switch change	Detects the setting switch change of the host station during data link. OFF : Not change ON : Change	○	○	×
SB0080	Other station's data link status	Indicates the communication status of the other stations. (SW0080 to SW0083). OFF : All stations normal ON : Faulty station exists It takes maximum of six seconds for this relay to turn on after a slave station connected to the master station or local station becomes faulty.	○	○	×
SB0081 ∗1	Other station watchdog timer error status	Indicates the watch dog timer error occurrence status in the other station (SW0084 to SW0087). OFF : No error ON : Error Depending on the refresh timing, this relay may be updated with the difference of one sequence scan from the update of Other station watchdog timer error occurrence status (SW0084 to SW0087).	○	○	×
SB0082 ∗1	Other station fuse blown status	Indicates the fuse blow occurrence status in the other station (SW0088 to SW008B). OFF : Not blown ON : Blown Depending on the refresh timing, this relay may be updated with the difference of one sequence scan from the update of Other station fuse blown status (SW0088 to SW008B).	○	○	×
SB0083 ∗1	Other station switch change status	Detects the setting switch change of the other station during data link. OFF : Not change ON : Change Depending on the refresh timing, this relay may be updated with the difference of one sequence scan from the update of Other station switch change status (SW008C to SW008F).	○	○	×
SB0090	Host line status	Indicates the hot station line status. OFF : Normal ON : Error (disconnection)	×	○	×

∗1: Link special relay added to the function version B or later

Table 8.1 Link special relay list (continued)

Number	Name	Description	Availability (○ : available, × : not available)		
			Online		Offline
			Master station	Local station	
SB0094 ＊1	Transient transmission status	Indicates the transient transmission error occurrence status (SW0094 to SW00897). OFF : No error ON : Error Depending on the refresh timing, this relay may be updated with the difference of one sequence scan from the update of Transient transmission error status (SW0094 to SW0097).	○	○	×
SB0095 ＊1	Master station transient transmission status	Indicates the transient transmission status of the master station. OFF : Normal ON : Error	×	○	×
SB00A0 ＊2	RECV instruction (1) execution request flag	Indicates the RECV instruction execution request status (when channel 1 is used). (Usable on AJ61QBT11 and A1SJ61QBT11) OFF : No execution request ON : Execution request	○	○	×
SB00A1 ＊2	RECV instruction (2) execution request flag	Indicates the RECV instruction execution request status (when channel 1 is used). (Usable on AJ61QBT11 and A1SJ61QBT11) OFF : No execution request ON : Execution request	○	○	×

＊1: Link special relay added to the function version B or later
＊2: Link special relay added to the software version J manufactured in Jan., 1998 or later

8.4.2 Link special register (SW)

SW0000 to SW003F are stored in the sequence program, and SW0040 to SW00FF are automatically stored.
The value in the ( ) next to the number indicates the buffer memory address.
When using a master/local module as a standby master station, refer to the respective columns under "Availability" in the table as explained below.

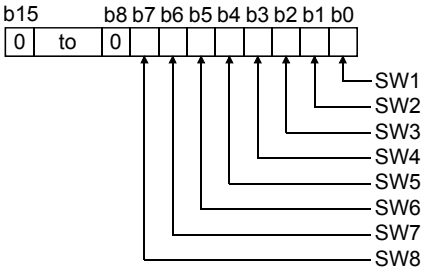
- When a standby master station is operating as a master station: "Master station" column
- When a standby master station is operating as a standby master station: "Local station" column

Table 8.2 Link special register list

Number	Name	Description	Availability (○ : available, × : not available)		
			Online		Offline
			Master station	Local station	
SW0003 ∗ (603H)	Multiple temporary error invalid station specification	Selects whether to specifies multiple temporary error invalid stations: 00 : Specifies multiple stations as indicated in SW0004 to SW0007. 01 to 64 : Specifies a single station from 1 to 64. ※ Specifies the station number used as the temporary error invalid station.	○	×	×
SW0004 ∗ (604H) SW0005 ∗ (605H) SW0006 ∗ (606H) SW0007 ∗ (607H)	Temporary error invalid station specification ∗1	Specifies the temporary error invalid station. 0 : Not specified as a temporary error invalid station. 1 : Specified as a temporary error invalid station. b15 b14 b13 b12 to b3 b2 b1 b0 SW0004: 16 15 14 13 to 4 3 2 1 SW0005: 32 31 30 29 to 20 19 18 17 SW0006: 48 47 46 45 to 36 35 34 33 SW0007: 64 63 62 61 to 52 51 50 49 1 to 64 in the table indicates station numbers.	○	×	×
SW0008 ∗ (608H)	Line test station setting	Sets the station to perform line tests. 0 : Entire system (performed for all stations) 01 to 64 : Specified station Default value : 0	○	×	×
SW0009 ∗ (609H)	Watchdog time setting	Sets the response monitoring time for transient transmission. Default value : 5 (s) Setting range : 0 to 360 (s) ※ When a value out of the range is set, the value will be set to 360 seconds.	○	×	×
SW000A ∗ (60AH)	CPU watchdog time setting	Sets the CPU watchdog time when an access to CPU is gained through the AJ65BT-G4 using the dedicated instructions. Default value : 5 (s) Setting range : 0 to 3600 (s) ※ If a value out of the range is set, the value will be set to 3600s. Note: Set on the CC-Link master station or local station connected to the applicable CPU.	○	○	×
SW0020 ∗ (620H)	Module status	Stores the status of communications between the master/local module and the CPU module. 0 : Normal Other than 0 : Stores error code (Refer to the manual for the CPU module used.)	○	○	○
SW0041 (641H)	Data link restart result	Stores the execution results of the data link restart specification by SB0000. 0 : Normal Other than 0 : Stores error code (Refer to Section 13.3.)	○	○	×
SW0043 ∗ (643H)	Master station switch data link start result	Indicates the switch specification execution result and stores the execution results of the master station switch data link start specification by SB0001.(Usable on standby master station) 0 : Normal Other than 0 : Stores error code (Refer to Section 13.3.)	×	×	×
SW0045 (645H)	Data link stop result	Stores the execution results of the data link stop specification by SB0002. 0 : Normal Other than 0 : Error code (Refer to Section 13.3.)	○	○	×

∗ : Link special relay added to the function version B or later
∗1 : Turns on only the bit for the head station number.

Table 8.2 Link special register list (continued)

Number	Name	Description	Availability (○ : available, × : not available)		
			Online		Offline
			Master station	Local station	
SW0049 (649H)	Temporary error invalid station request result	Stores the execution results of the temporary error invalid station request specification by SB0004. 0 : Normal Other than 0 : Stores error code (Refer to Section 13.3.)	○	×	×
SW004B (64BH)	Temporary error invalid station cancelling request result	Stores the execution results of the temporary error invalid station cancelling request specification by SB0005. 0 : Normal Other than 0 : Stores error code (Refer to Section 13.3.)	○	×	×
SW004D ＊ (64DH)	Line test request result	Stores the execution results of the line test request specification by SB0008. 0 : Normal Other than 0 : Stores error code (Refer to Section 13.3.)	○	×	×
SW004F ＊ (64FH)	Parameter setting test request result	Stores the execution results of the parameter setting test request by SB0009. 0 : Normal Other than 0 : Stores error code	○	×	×
SW0060 (660H)	Mode setting switch status	Stores the setting status of the mode setting switch. 0: Online (remote net mode) 1: Online (remote I/O net mode) 2: Offline 3: Line test 1 4: Line test 2 5: Parameter verification test 6: Hardware test	○	○	○
SW0061 (661H)	Station number setting switch status	Stores the station number setting switch's setting status. 0 : Master station 1 to 64 : Local station	○	○	○
SW0062 (662H)	Condition setting switch status	The setting status of the condition setting switch (DIP switch) is stored. 0: OFF 1: ON 	○	○	○
SW0064 ＊ (664H)	No. of retries setting information	Stores the number of retries setting information when responding to an error. 1 to 7 (times)	○	×	×
SW0065 ＊ (664H)	No. of automatic return stations information	Stores the number of automatic return stations setting information during one link scan. 1 to 10 (modules)	○	×	×
SW0066 ＊ (666H)	Delay timer information	Stores the delay time setting information.	○	×	×
SW0067 (667H)	Parameter information	The parameter information area to be used is stored. 1: Buffer memory (data link startup by Yn6) 2: E^2PROM (data link startup by Yn8)	○	×	○
SW0068 (668H)	Host parameter status	Parameter setting status is stored. 0 : Normal Other than 0 : Stores error code (Refer to Section 13.3.)	○	×	×

＊ : Link special relay added to the function version B or later

Table 8.2 Link special register list (continued)

Number	Name	Description	Availability (○ : available, × : not available) Online: Master station	Online: Local station	Offline
SW0069 (669H)	Loading status ＊2	The station number overlap and consistency with the parameters are stored for each module. 0 : Normal Other than 0 : Stores error code (Refer to Section 13.3.) ※ Details are stored in SW0098 to 9B and SW009C to 9F.	○	×	×
SW006A (66AH)	Switch setting status	Switch setting status is stored. 0 : Normal Other than 0 : Stores error code (Refer to Section 13.3.)	○	○	×
SW006D (66DH)	Max. link scan time	Stores the maximum value of the link scan time (in 1 ms units).	○	○	×
SW006E (66EH)	Current link scan time	Stores the current value of the link scan time (in 1 ms units).	○	○	×
SW006F (66FH)	Min. link scan time	Stores the minimum value of the link scan time (in 1 ms units).	○	○	×
SW0070 (670H)	Total number of stations	Stores the final station number set in the parameter. 1 to 64 stations	○	×	×
SW0071 (671H)	Max. communication station number	Stores the maximum station number (station number of the station number setting switch) in the data link. 1 to 64 (stations)	○	×	×
SW0072 (672H)	Number of connected modules	Stores the number of modules in the data link. 1 to 64 (modules)	○	×	×
SW0073＊ (673H)	Standby master station number	Stores the standby master station number. 1 to 64 (stations)	○	○	×
SW0074 (674H) SW0075 (675H) SW0076 (676H) SW0077 (677H)	Reserved station specified status ＊1	Stores the setting status of reserved station. 0: Not reserved station 1: Reserved station b15 b14 b13 b12 to b3 b2 b1 b0 SW0074: 16 15 14 13 to 4 3 2 1 SW0075: 32 31 30 29 to 20 19 18 17 SW0076: 48 47 46 45 to 36 35 34 33 SW0077: 64 63 62 61 to 52 51 50 49 1 to 64 in the table indicates station numbers.	○	○	×
SW0078 (678H) SW0079 (679H) SW007A (67AH) SW007B (67BH)	Error invalid station specified status ＊1	Stores the error invalid station setting status. 0: Not error invalid station 1: Error invalid station b15 b14 b13 b12 to b3 b2 b1 b0 SW0078: 16 15 14 13 to 4 3 2 1 SW0079: 32 31 30 29 to 20 19 18 17 SW007A: 48 47 46 45 to 36 35 34 33 SW007B: 64 63 62 61 to 52 51 50 49 1 to 64 in the table indicates station numbers.	○	○	×
SW007C＊ (67CH) SW007D＊ (67DH) SW007E＊ (67EH) SW007F＊ (67FH)	Temporary error invalid station specified status＊1	Stores the temporary error invalid station specified status. 0 : Not temporary error invalid station 1 : Temporary error invalid station b15 b14 b13 b12 to b3 b2 b1 b0 SW007C: 16 15 14 13 to 4 3 2 1 SW007D: 32 31 30 29 to 20 19 18 17 SW007E: 48 47 46 45 to 36 35 34 33 SW007F: 64 63 62 61 to 52 51 50 49 1 to 64 in the table indicates station numbers.	○	○	×

＊ : Link special register added to the function version B or later

＊1 : Turns on only the bit for the head station number.

＊2 : Check is performed only when the link is started up, and stored.

Table 8.2 Link special register list (continued)

Number	Name	Description	Availability (○ : available, × : not available) Online: Master station	Online: Local station	Offline
SW0080 (680H) SW0081 (681H) SW0082 (682H) SW0083 (683H)	Other station data link status ＊3＊6	Stores the data link status of each station. 0: Normal 1: Data link error occurred b15 b14 b13 b12 to b3 b2 b1 b0 SW0080 16 15 14 13 to 4 3 2 1 SW0081 32 31 30 29 to 20 19 18 17 SW0082 48 47 46 45 to 36 35 34 33 SW0083 64 63 62 61 to 52 51 50 49 1 to 64 in the table indicates station numbers.	○	○	×
SW0084＊ (684H) SW0085＊ (685H) SW0086＊ (686H) SW0087＊ (687H)	Other station watchdog timer error occurrence status ＊1	Stores the other station watchdog timer error occurrence status. 0: Normal 1: Watchdog timer error occurrence b15 b14 b13 b12 to b3 b2 b1 b0 SW0084 16 15 14 13 to 4 3 2 1 SW0085 32 31 30 29 to 20 19 18 17 SW0086 48 47 46 45 to 36 35 34 33 SW0087 64 63 62 61 to 52 51 50 49 1 to 64 in the table indicates station numbers.	○	○	×
SW0088 (688H) SW0089 (689H) SW008A (68AH) SW008B (68BH)	Other station fuse blown status ＊3	Stores the fuse blown status of each station. 0: Normal 1: Fuse blown b15 b14 b13 b12 to b3 b2 b1 b0 SW0088 16 15 14 13 to 4 3 2 1 SW0089 32 31 30 29 to 20 19 18 17 SW008A 48 47 46 45 to 36 35 34 33 SW008B 64 63 62 61 to 52 51 50 49 1 to 64 in the table indicates station numbers.	○	×	×
SW008C＊ (68CH) SW008D＊ (68DH) SW008E＊ (68EH) SW008F＊ (687FH)	Other station switch change status ＊1	Stores the switch change status of other station during data link. 0: Not change 1: Change b15 b14 b13 b12 to b3 b2 b1 b0 SW008C 16 15 14 13 to 4 3 2 1 SW008D 32 31 30 29 to 20 19 18 17 SW008E 48 47 46 45 to 36 35 34 33 SW008F 64 63 62 61 to 52 51 50 49 1 to 64 in the table indicates station numbers.	○	○	×
SW0090 (690H)	Host station line status	Stores the host station line status. 0: Normal 1: Data link not possible (wire breakage)	×	○	×

＊ : Link special register added to the function version B or later

＊1 : Turns on only the bit for the head station number.

＊3 : Turns on the bit for the number of occupied stations.

＊6 : A value stored in a CC-Link Ver.2.00-compatible slave station differs depending on the hardware version of the A1SJ61QBT11.
Hardware version M or earlier: “1: Data link error occurred”
Hardware version N or later: “0: Normal”
The A1SJ61QBT11, however, cannot perform cyclic transmission and transient transmission with CC-Link Ver.2.00-compatible slave stations regardless of the hardware version.

Table 8.2 Link special register list (continued)

Number	Name	Description	Availability (○ : available, × : not available) Online: Master station	Online: Local station	Offline
SW0094 ∗ (694H) SW0095 ∗ (695H) SW0096 ∗ (696H) SW0097 ∗ (697H)	Transient transmission error status ∗1	Stores the transient transmission error occurrence status for each station. 0: Normal 1: Transient transmission error occurrence SW0094: 16 15 14 13 to 4 3 2 1 SW0095: 32 31 30 29 to 20 19 18 17 SW0096: 48 47 46 45 to 36 35 34 33 SW0097: 64 63 62 61 to 52 51 50 49 1 to 64 in the table indicates station numbers.	○	○	×
SW0098 (698H) SW0099 (699H) SW009A (69AH) SW009B (69BH)	Station number overlap status ∗4	The overlapping status is stored when each module's first station number dose not overlap. 0: Normal 1: Station number overlaps (only for the first station number) SW0098: 16 15 14 13 to 4 3 2 1 SW0099: 32 31 30 29 to 20 19 18 17 SW009A: 48 47 46 45 to 36 35 34 33 SW009B: 64 63 62 61 to 52 51 50 49 1 to 64 in the table indicates station numbers.	○	×	×
SW009C (69CH) SW009D (69DH) SW009E (69EH) SW009F (69FH)	Loading/parameter consistency status ∗4	The consistency status with the parameters are stored. 0: Normal 1: Consistency error SW009C: 16 15 14 13 to 4 3 2 1 SW009D: 32 31 30 29 to 20 19 18 17 SW009E: 48 47 46 45 to 36 35 34 33 SW009F: 64 63 62 61 to 52 51 50 49 1 to 64 in the table indicates station numbers.	○	×	×
SW00B4 (6B4H) SW00B5 (6B5H) SW00B6 (6B6H) SW00B7 (6B7H)	Line test 1 result ∗3	Line test 1 test results are stored. 0: Normal 1: Error SW00B4: 16 15 14 13 to 4 3 2 1 SW00B5: 32 31 30 29 to 20 19 18 17 SW00B6: 48 47 46 45 to 36 35 34 33 SW00B7: 64 63 62 61 to 52 51 50 49 1 to 64 in the table indicates station numbers.	×	×	○
SW00B8 (6B8H)	Line test 2 result	Stores the line test 2 results. 0 : Normal Other than 0 : Stores error code (Refer to Section 13.3.)	×	×	○
SW00B9 (6B9H)	E^2PROM registration status	E^2PROM parameter registration status is stored. 0 : Normal Other than 0 : Stores error code (Refer to Section 13.3.)	○	×	×
SW00BA ∗5 (6BAH)	E^2PROM erasure result	The result of E^2PROM erasure request (YnD) is stored. 0 : Normal Other than 0 : Stores the error code.	○	×	×
SW00BB ∗5 (6BBH)	Checks the number of times when parameters can be registered to E^2PROM.	The number of times when parameters can be registered to E^2PROM is stored. Decremented when the parameter registration request to E^2PROM (YnA) is given.	○	×	×

∗ : It is the link special relay which had been added by function version B or later.
∗1 : Turns on only the bit for the head station number.
∗3 : Turns on the bit for the number of occupied stations.
∗4 : Turns on only the bit for the head station number. And check is performed only when the link is started up, and stored.
∗5 : Link special register added to the software version E (manufactured in Aug., 2001) or later of the A1SJ61QBT11.

The timing when the link special register (SW) data is updated differs depending on the number.
The update timing is indicated in Table 8.3.

Table 8.3 Update timing of the link special register

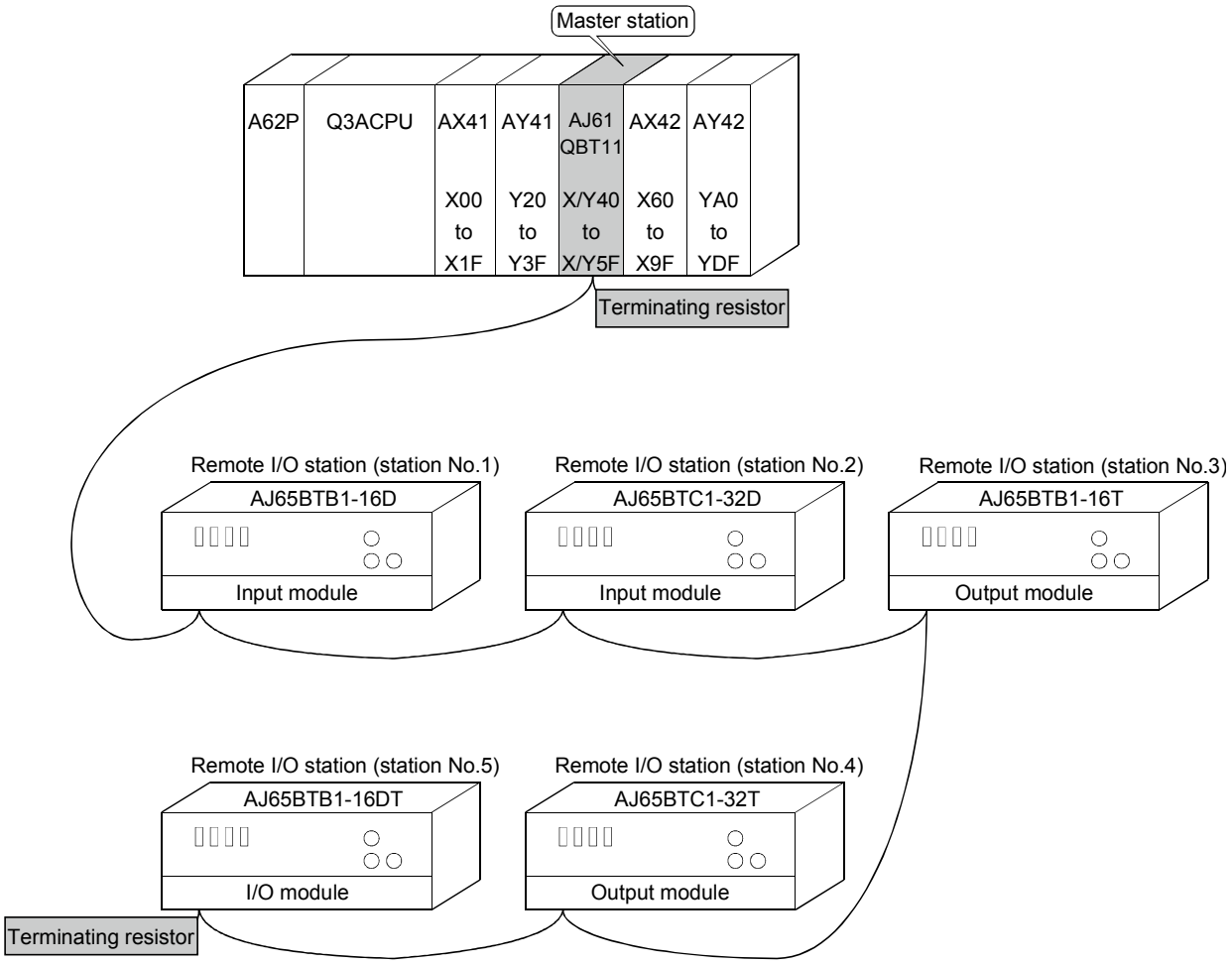
Link special register	Data update timing	Link special register	Data update timing
SW0041	Updated independently regardless of SB	SW0071	Updated independently regardless of SB (Update after each station is stabilized.)
SW0045		SW0072	When SB0074 changes
SW0060	When SB0060 changes	SW0074 to SW0077	When SB0075 changes
SW0061	When SB0061 changes	SW0078 to SW007B	When SB0080 changes
SW0062	Updated independently regardless of SB	SW0080 to SW0083	Updated independently regardless of SB
SW0067		SW0088 to SW008B	When SB0090 changes
SW0068		SW0090	Updated independently regardless of SB
SW0069		SW0098 to SW009B	
SW006A		SW009C to SW009F	
SW006D		SW00B4 to SW00B7	
SW006E		SW00B8	
SW006F		SW00B9	
SW0070		–	–

9. COMMUNICATION BETWEEN THE MASTER STATION AND THE REMOTE I/O STATION

How to set, program, and confirm the operation of the module is described using a system configuration example.

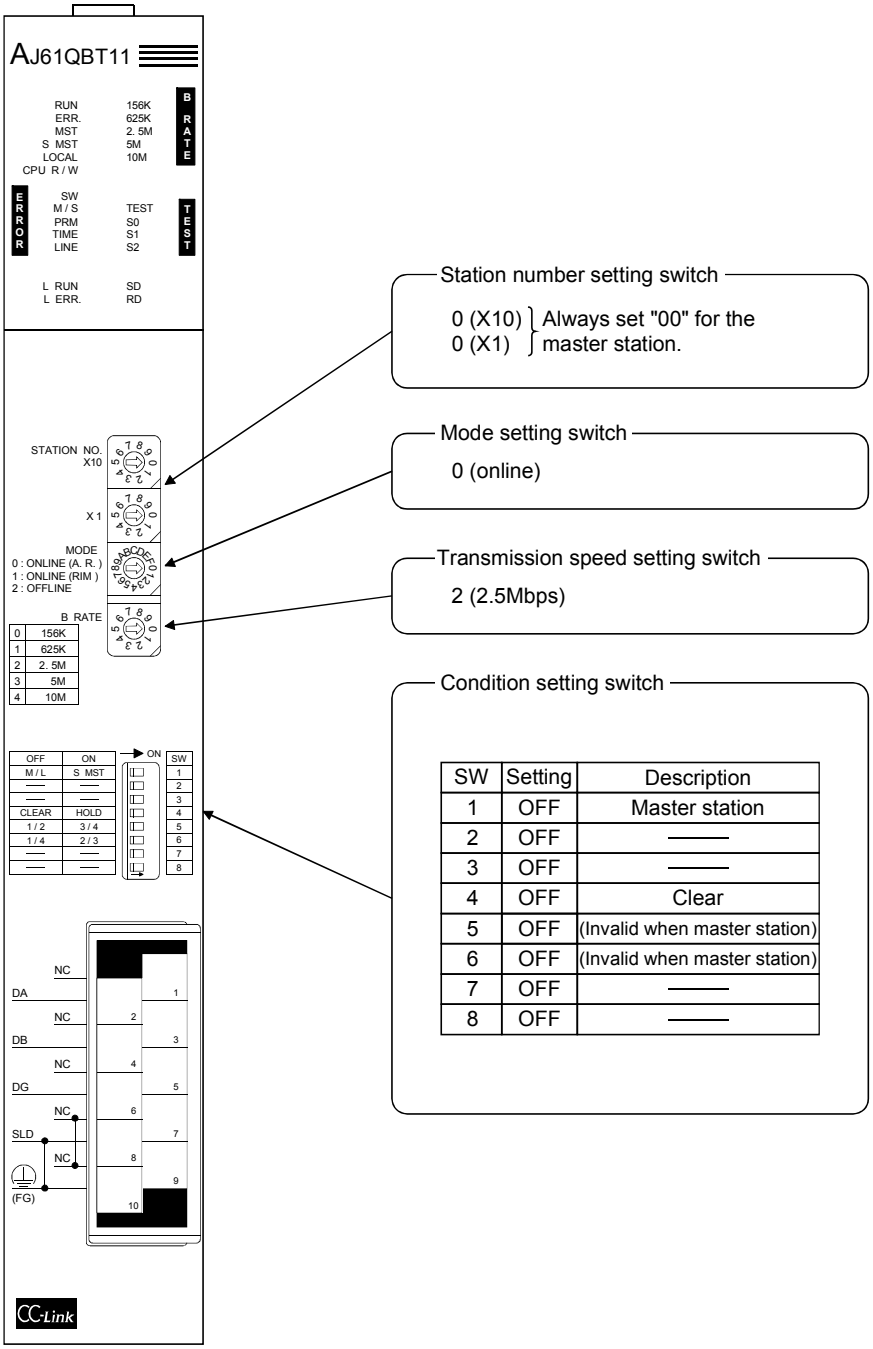
9.1 System Configuration

A system with five remote I/O stations is used as an example.



9.1.1 Setting of the master station

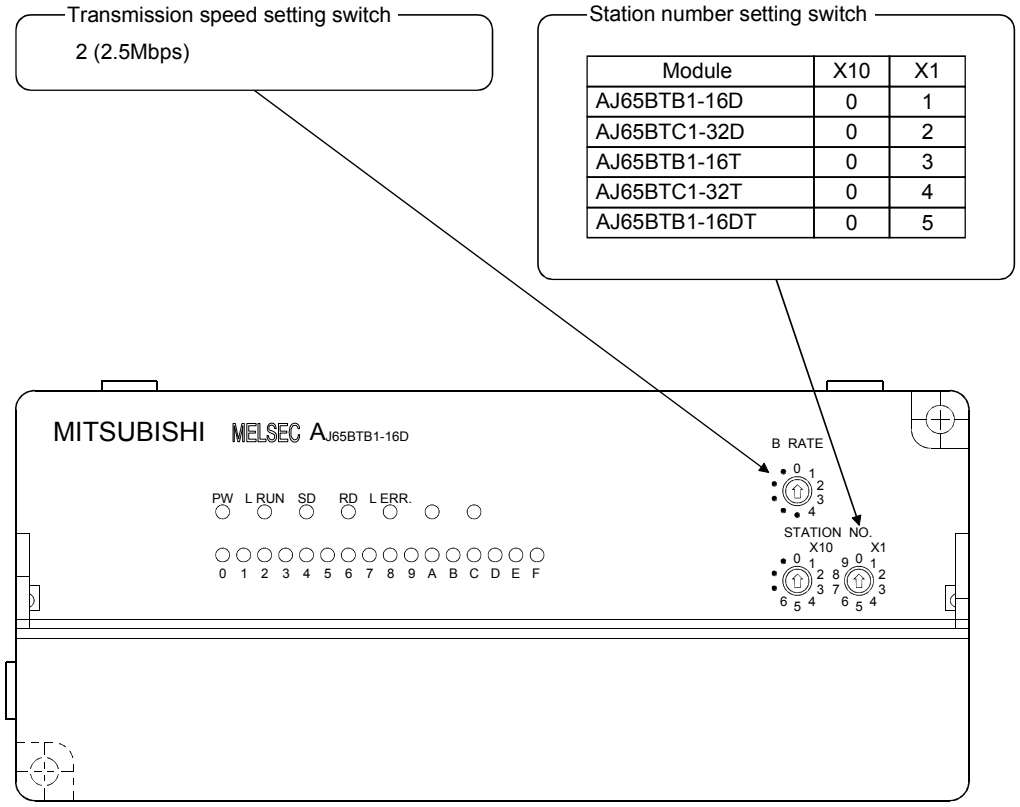
The settings of the switches on the master station are shown below:



SW	Setting	Description
1	OFF	Master station
2	OFF	———
3	OFF	———
4	OFF	Clear
5	OFF	(Invalid when master station)
6	OFF	(Invalid when master station)
7	OFF	———
8	OFF	———

9.1.2 Setting of the remote I/O station

The settings of the switches on the remote I/O station are shown below:



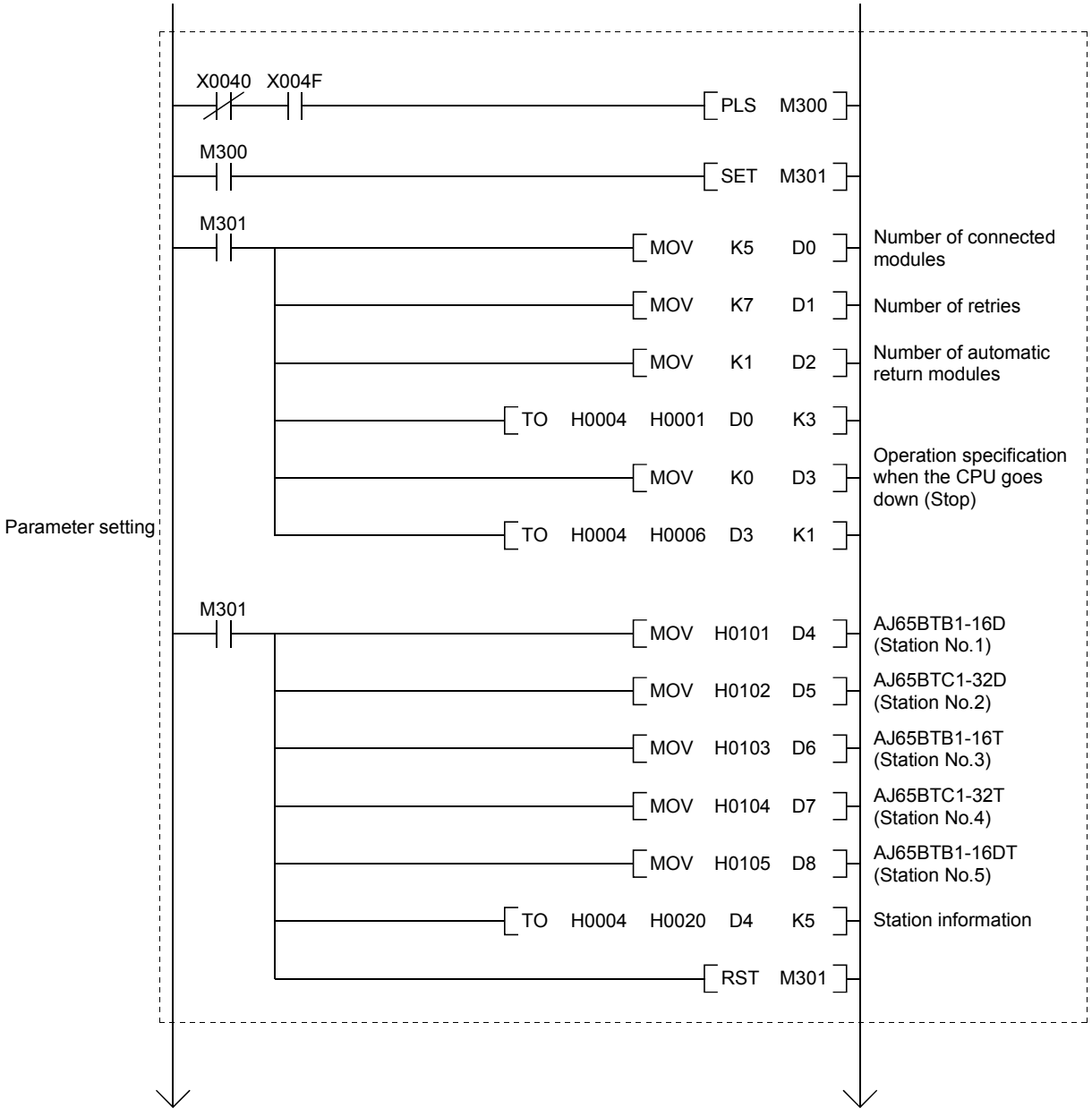
Module	X10	X1
AJ65BTB1-16D	0	1
AJ65BTC1-32D	0	2
AJ65BTB1-16T	0	3
AJ65BTC1-32T	0	4
AJ65BTB1-16DT	0	5

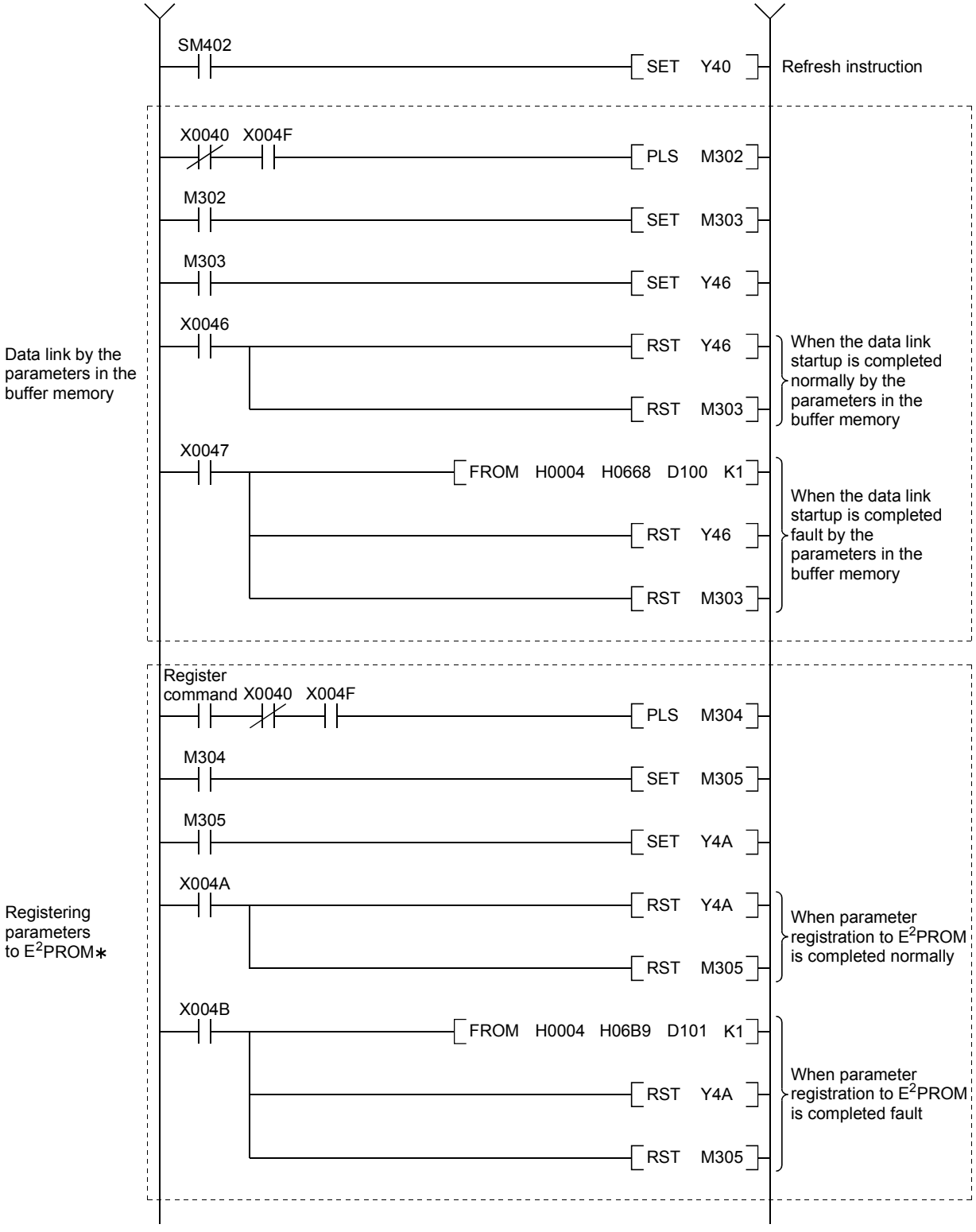
9.2 Creating a Program

9.2.1 Program for parameters

This program automatically initiates the data link when the programmable controller CPU starts running.

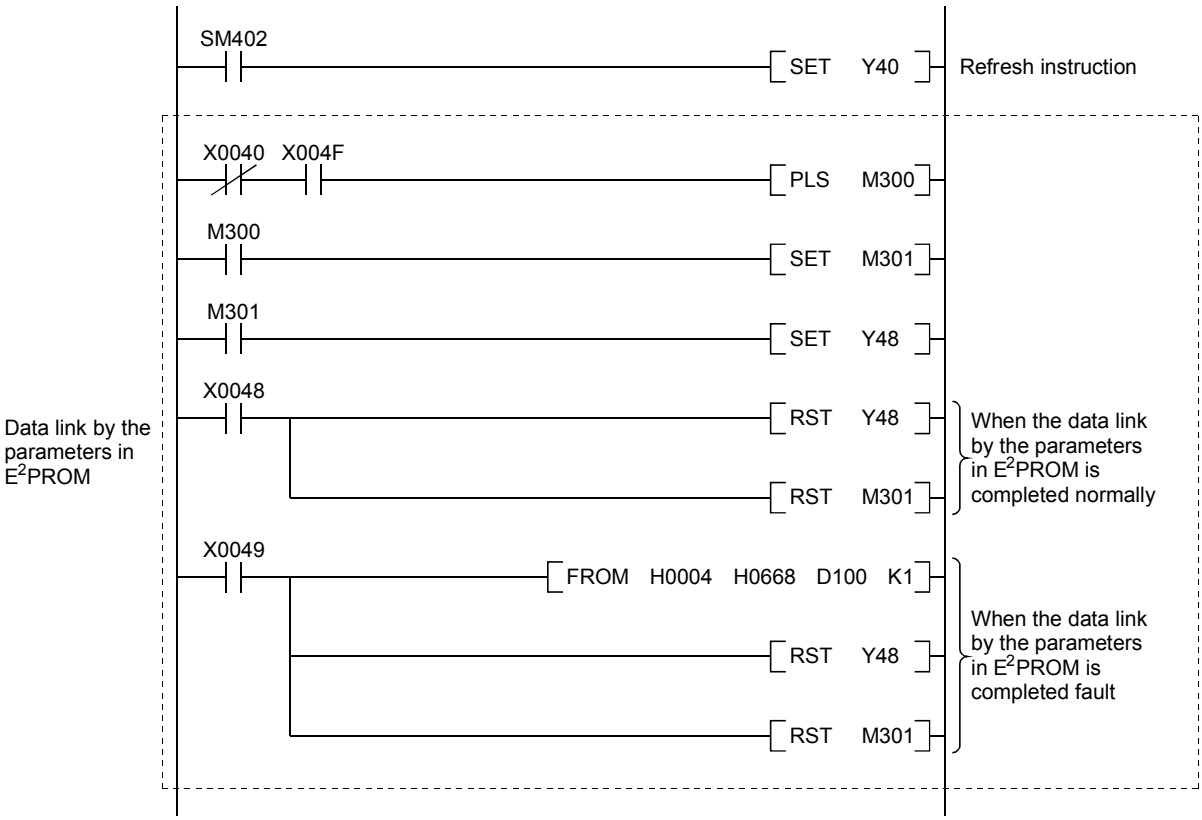
[When debugging]





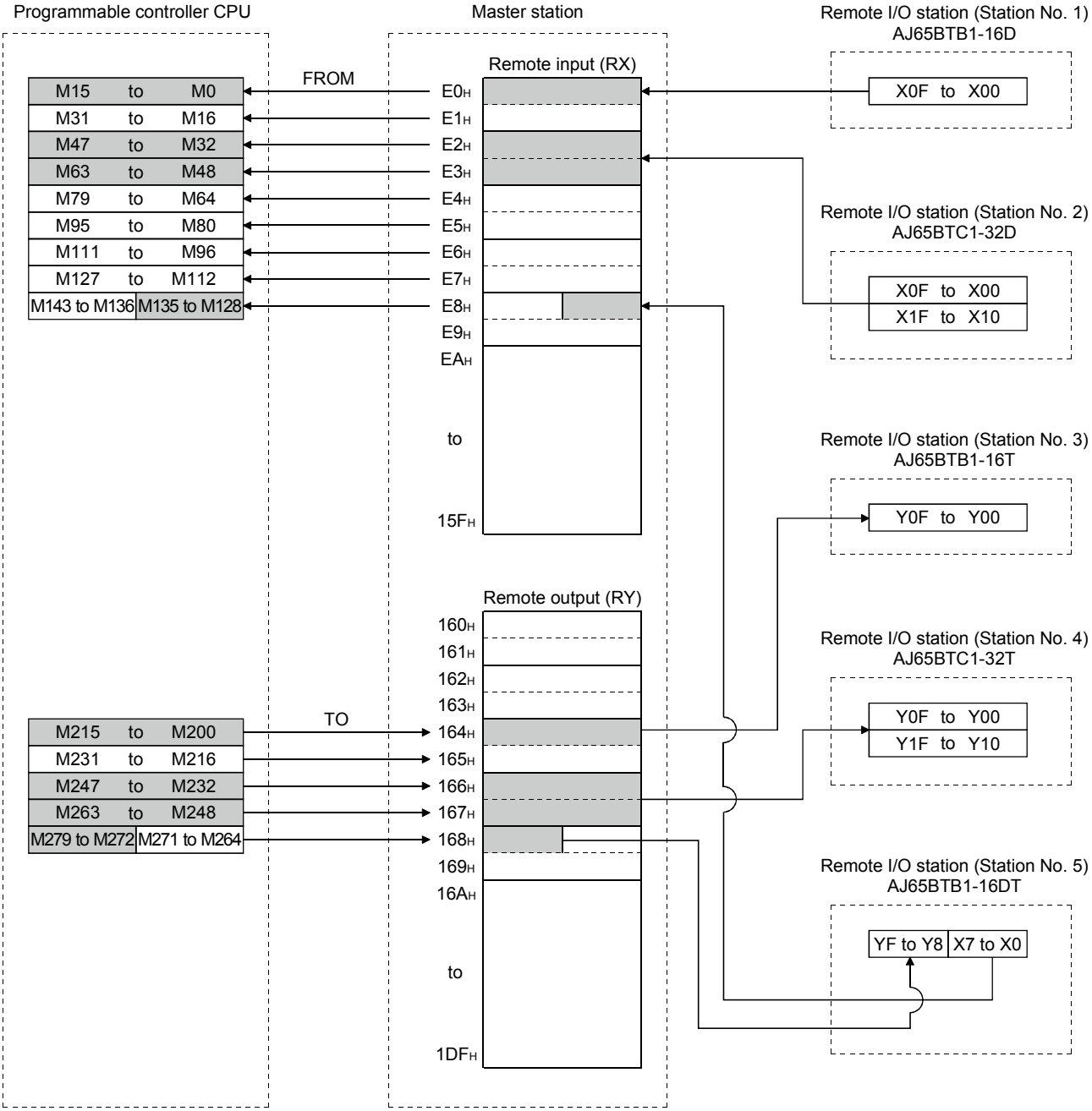
*: Refer to Section 8.2 when using the software version E (manufactured in Aug., 2001) or later of the A1SJ61QBT11.

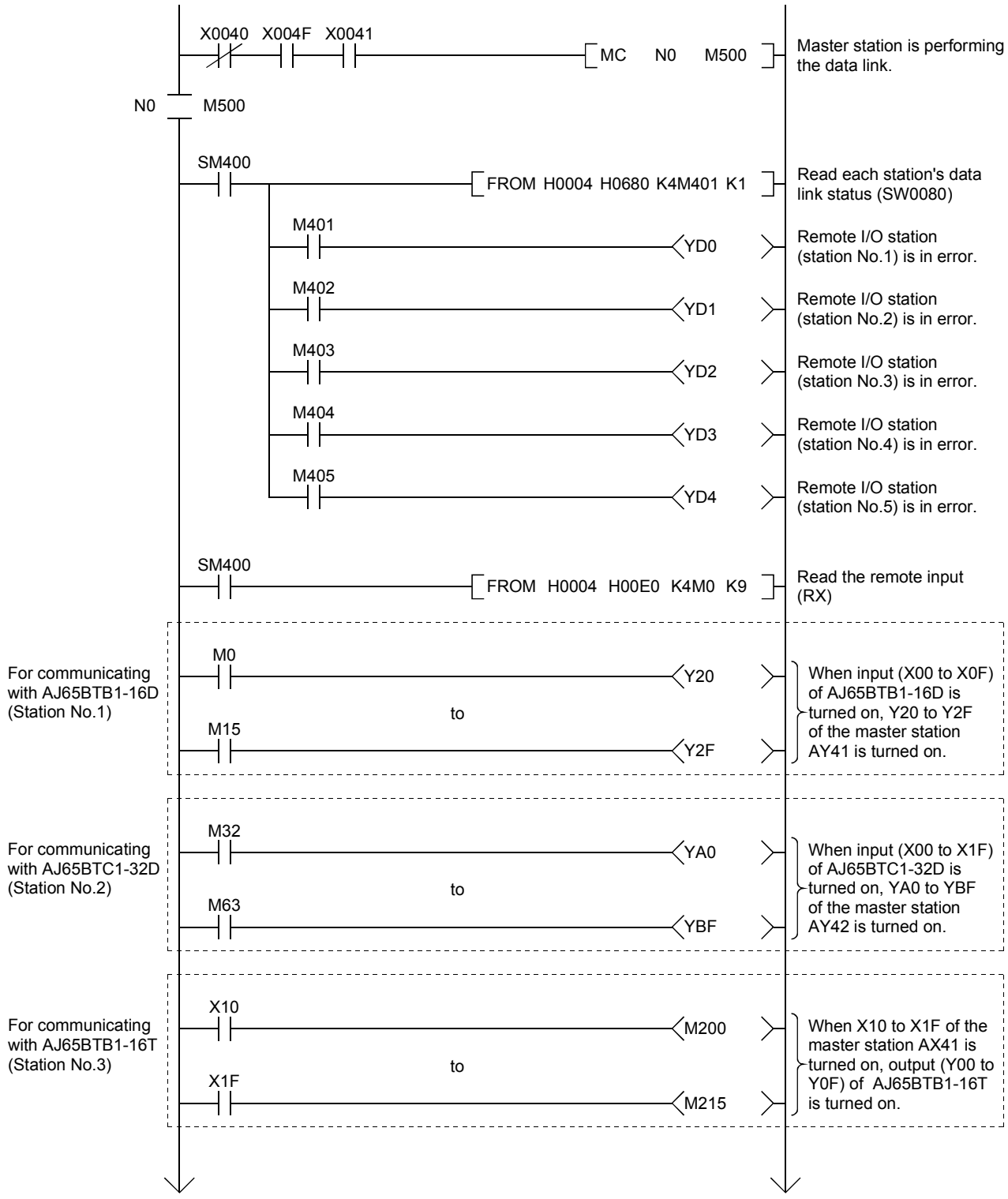
[During operation]

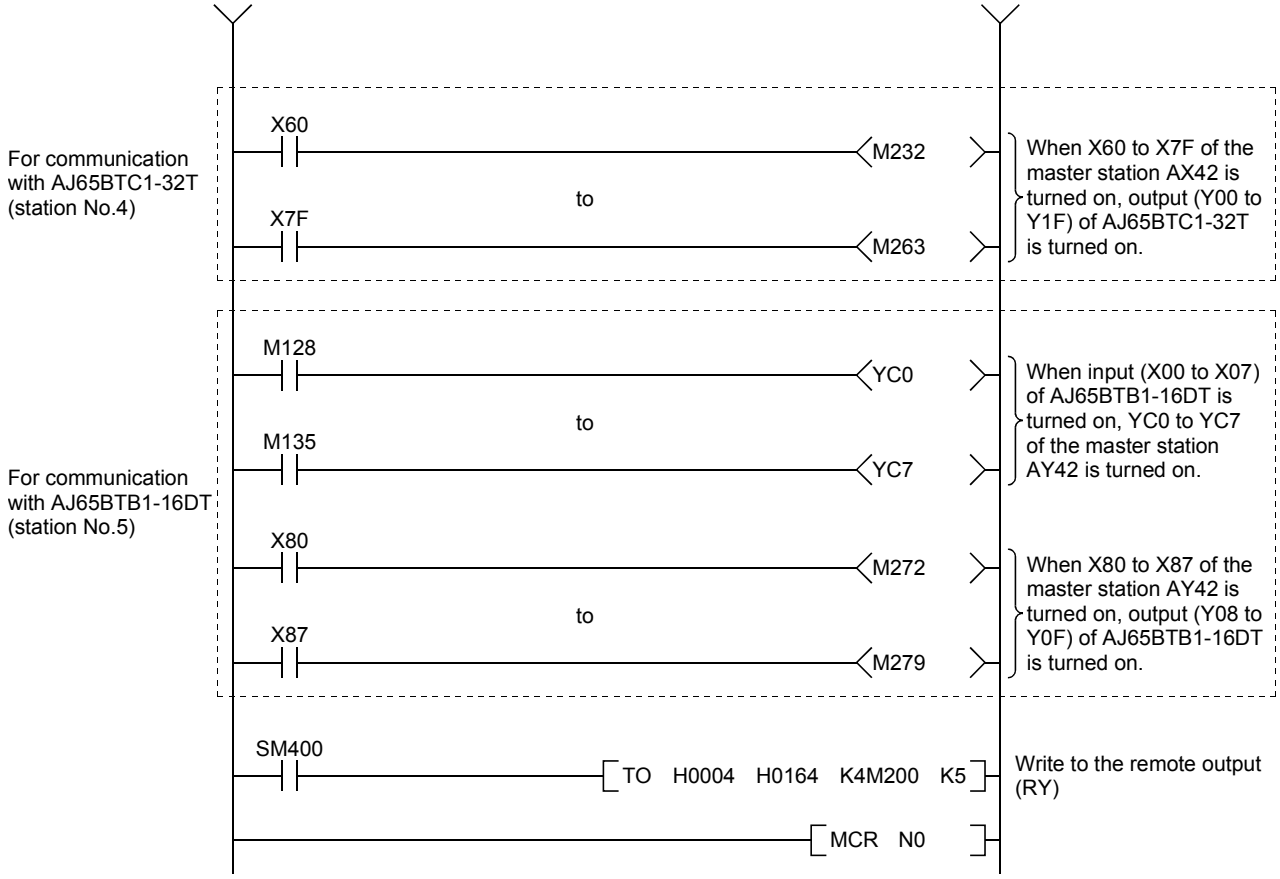


9.2.2 Communication program

A program to control the remote I/O stations is shown below.
The following configuration of the programmable controller CPU, master station's buffer memory and the remote I/O stations is assumed.




X0040 X004F X0041
MC N0 M500
Master station is performing the data link.
N0 M500
SM400
FROM H0004 H0680 K4M401 K1
Read each station's data link status (SW0080)
M401
YD0
Remote I/O station (station No.1) is in error.
M402
YD1
Remote I/O station (station No.2) is in error.
M403
YD2
Remote I/O station (station No.3) is in error.
M404
YD3
Remote I/O station (station No.4) is in error.
M405
YD4
Remote I/O station (station No.5) is in error.
SM400
FROM H0004 H00E0 K4M0 K9
Read the remote input (RX)
For communicating with AJ65BTB1-16D (Station No.1)
M0
Y20
to
M15
Y2F
When input (X00 to X0F) of AJ65BTB1-16D is turned on, Y20 to Y2F of the master station AY41 is turned on.
For communicating with AJ65BTC1-32D (Station No.2)
M32
YA0
to
M63
YBF
When input (X00 to X1F) of AJ65BTC1-32D is turned on, YA0 to YBF of the master station AY42 is turned on.
For communicating with AJ65BTB1-16T (Station No.3)
X10
M200
to
X1F
M215
When X10 to X1F of the master station AX41 is turned on, output (Y00 to Y0F) of AJ65BTB1-16T is turned on.


For communication with AJ65BTC1-32T (station No.4)
X60
M232
to
X7F
M263
When X60 to X7F of the master station AX42 is turned on, output (Y00 to Y1F) of AJ65BTC1-32T is turned on.
For communication with AJ65BTB1-16DT (station No.5)
M128
YC0
to
M135
YC7
When input (X00 to X07) of AJ65BTB1-16DT is turned on, YC0 to YC7 of the master station AY42 is turned on.
X80
M272
to
X87
M279
When X80 to X87 of the master station AY42 is turned on, output (Y08 to Y0F) of AJ65BTB1-16DT is turned on.
SM400
TO H0004 H0164 K4M200 K5
Write to the remote output (RY)
MCR N0

9.3 Performing the Data Link

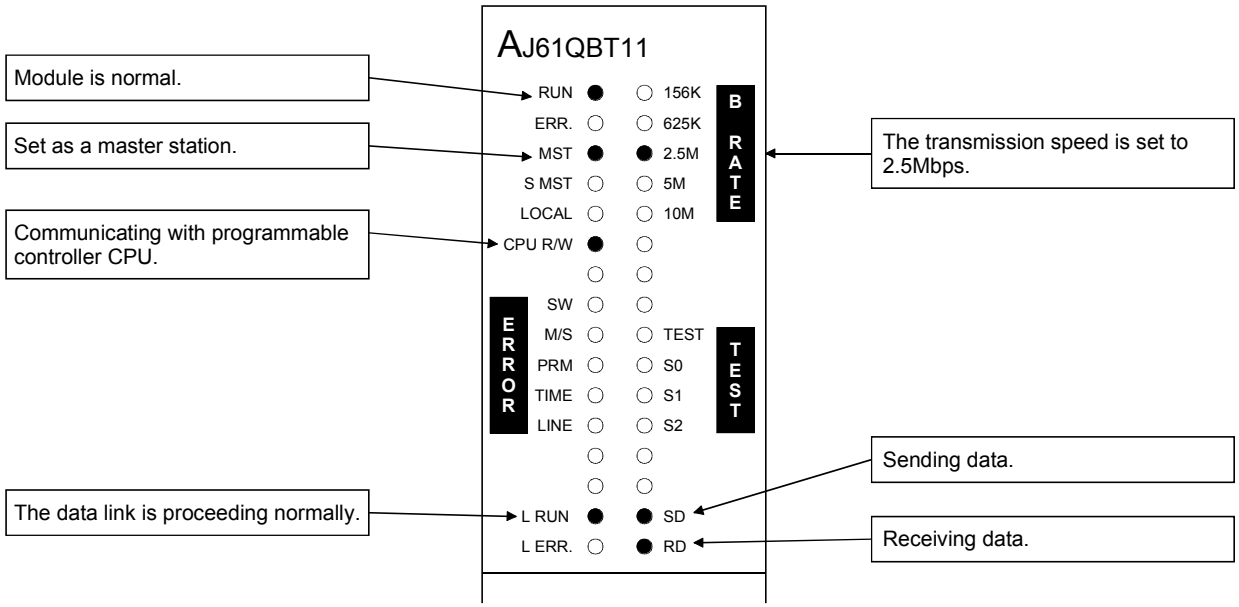
Turn on the power supply of the remote I/O station first, then the power supply of the master station to start the data link.

9.3.1 Confirming the operation by LED display

The following diagram shows the LED display status of the master station and the remote I/O station when the data link is performed normally.

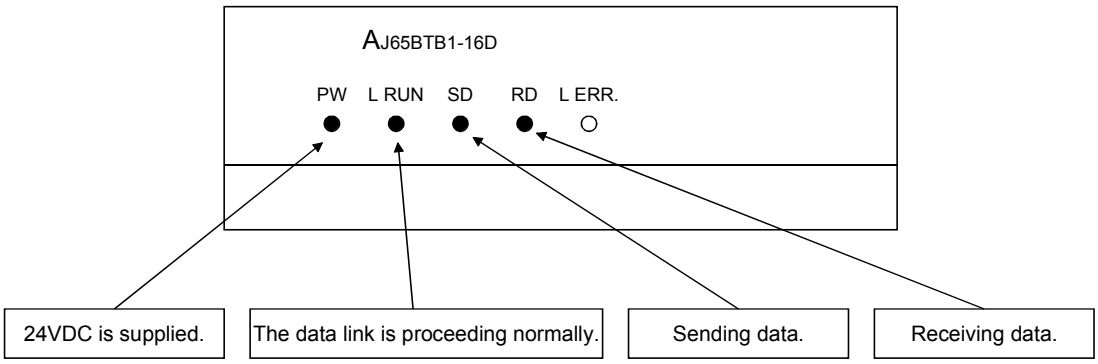
(1) LED display of the master station

Confirm that the LED display shows the following status:



(2) LED display of the remote I/O station

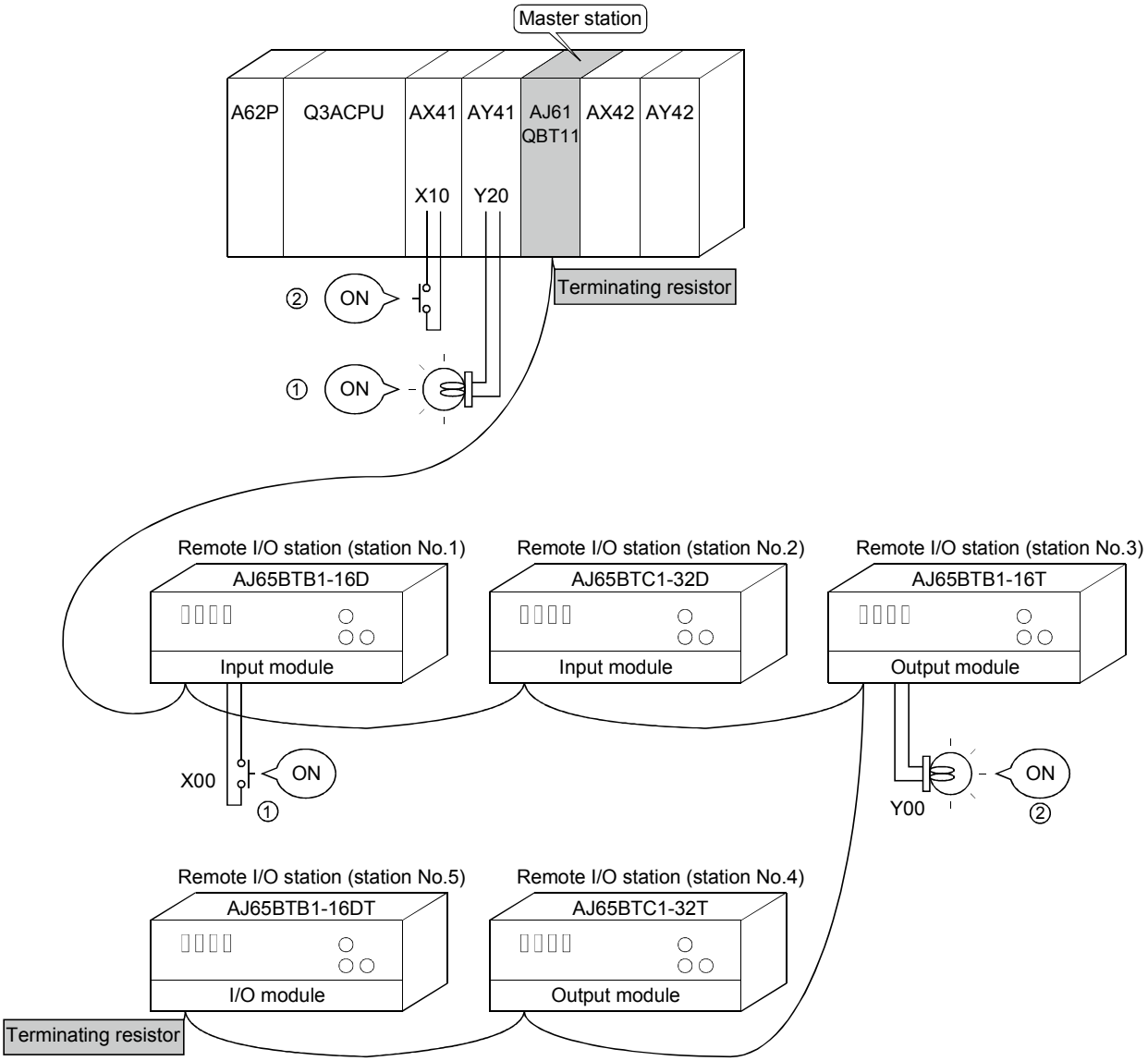
Confirm that the LED display shows the following status:



9.3.2 Confirming the operation by the program

Using the sequence program, confirm that the data link is proceeding normally.

① For example, when X00 of the remote I/O station AJ65BTB1-16D (station No.1) is turned on, Y20 (AY41) of the master station is turned on.
② When X10 (AX41) of the master station is turned on, Y00 of the remote I/O station AJ65BTB1-16T (station No.3) is turned on.



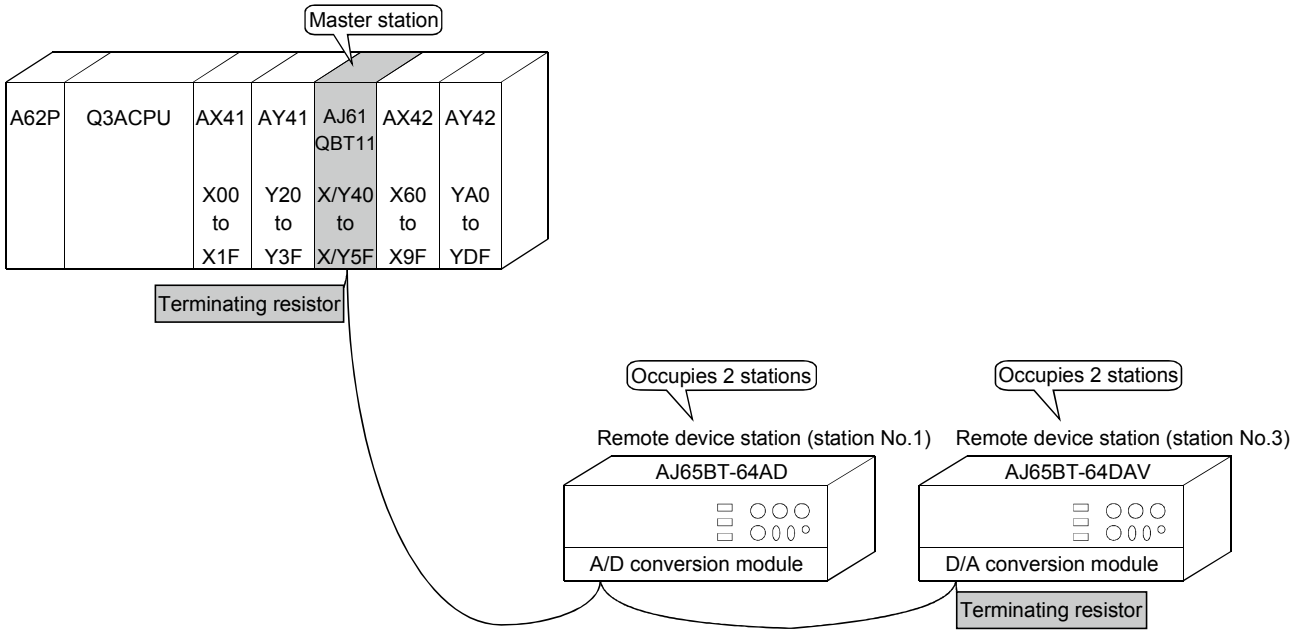
MEMO

10. COMMUNICATION BETWEEN THE MASTER STATION AND THE REMOTE DEVICE STATION

How to set, program, and confirm the operation of the module is described using a system configuration example.

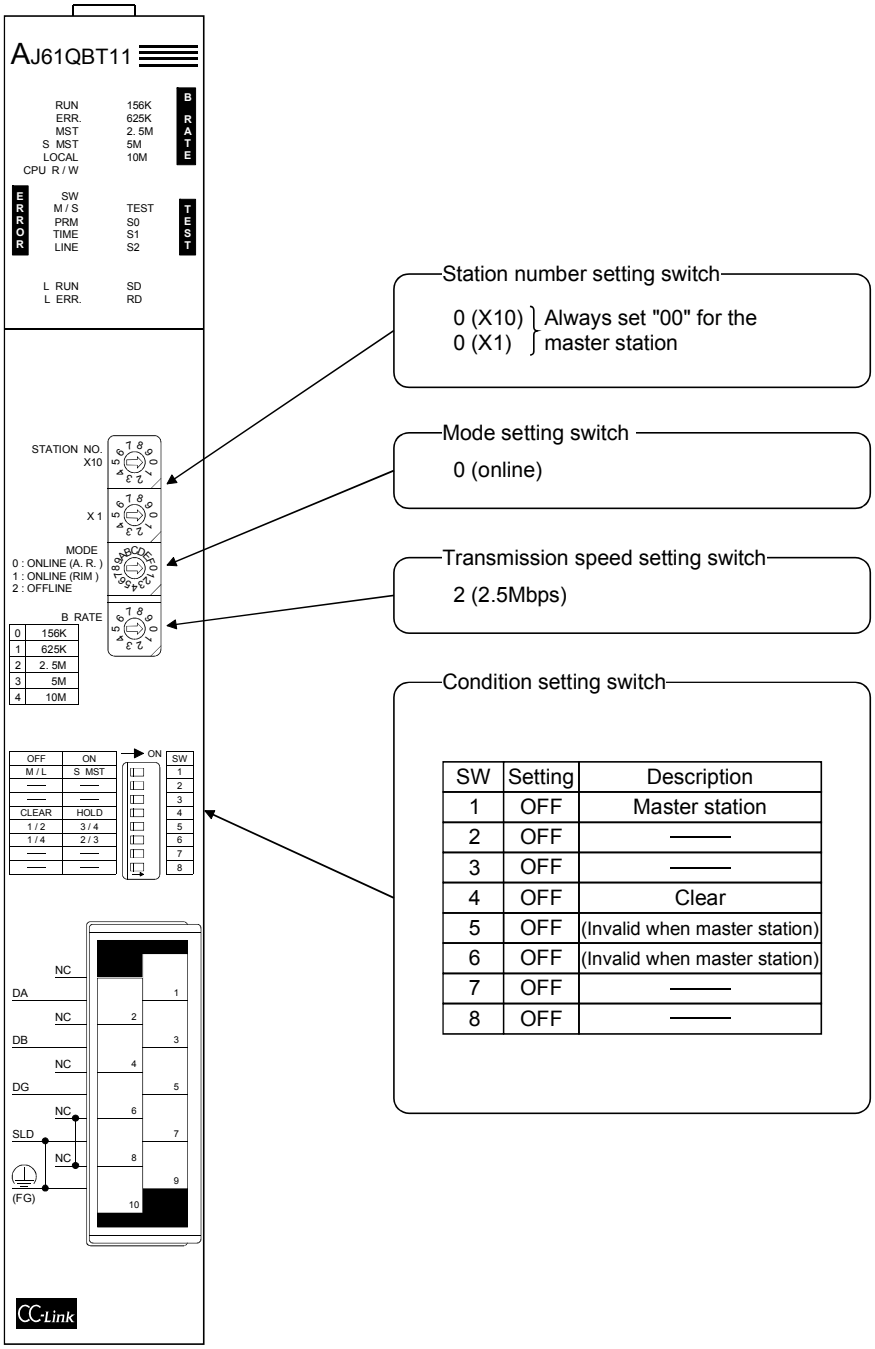
10.1 System Configuration

A system with two remote device stations is used as an example.



10.1.1 Setting of the master station

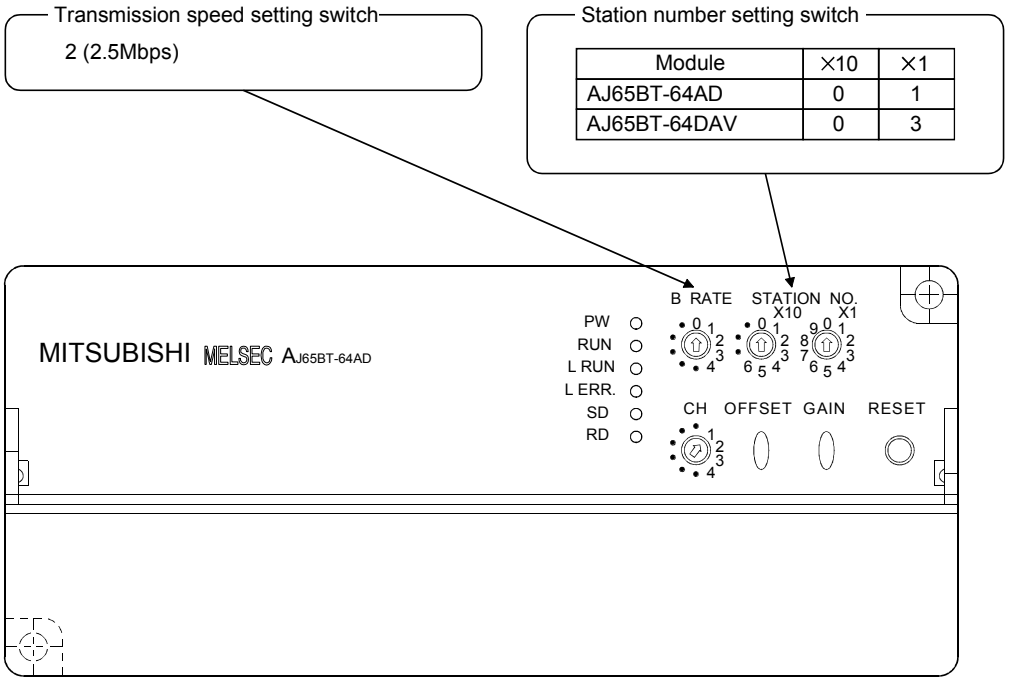
The settings of the switches on the master station are shown below:



SW	Setting	Description
1	OFF	Master station
2	OFF	———
3	OFF	———
4	OFF	Clear
5	OFF	(Invalid when master station)
6	OFF	(Invalid when master station)
7	OFF	———
8	OFF	———

10.1.2 Setting of the remote device station

The settings of the switches on the remote device station are shown below:

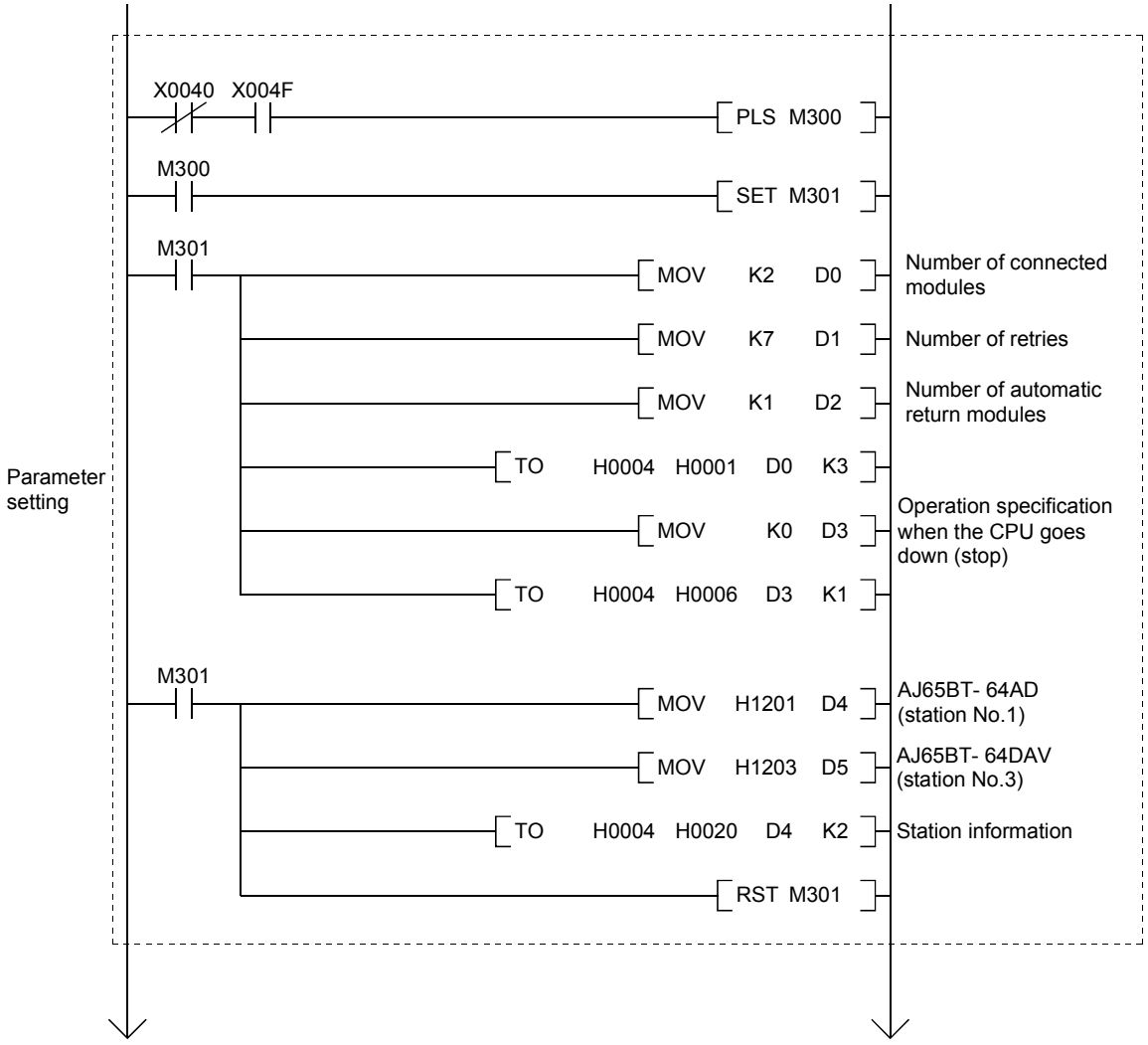


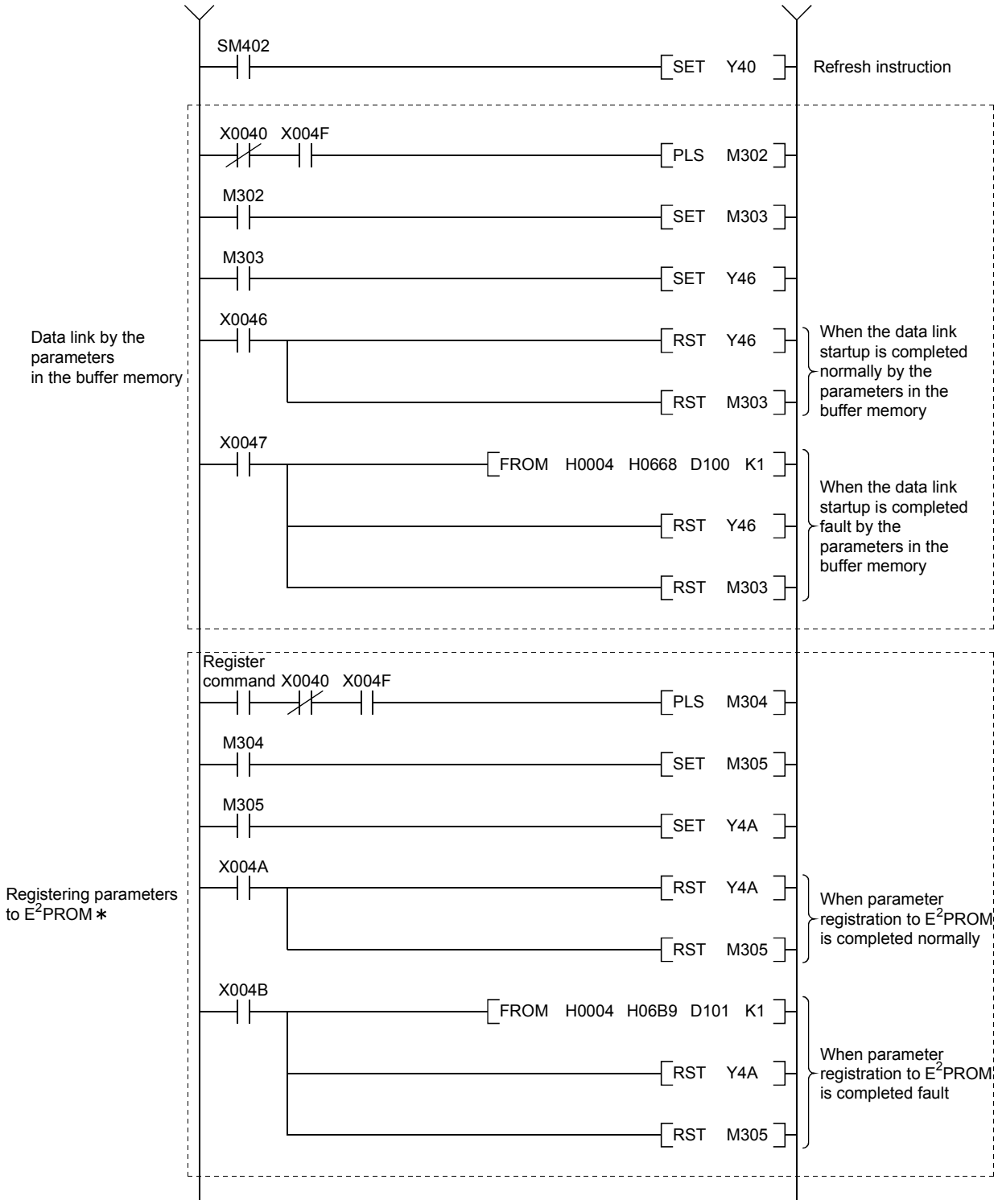
10.2 Creating a Program

10.2.1 Program for parameters

This program automatically initiates the data link when the programmable controller CPU starts running.

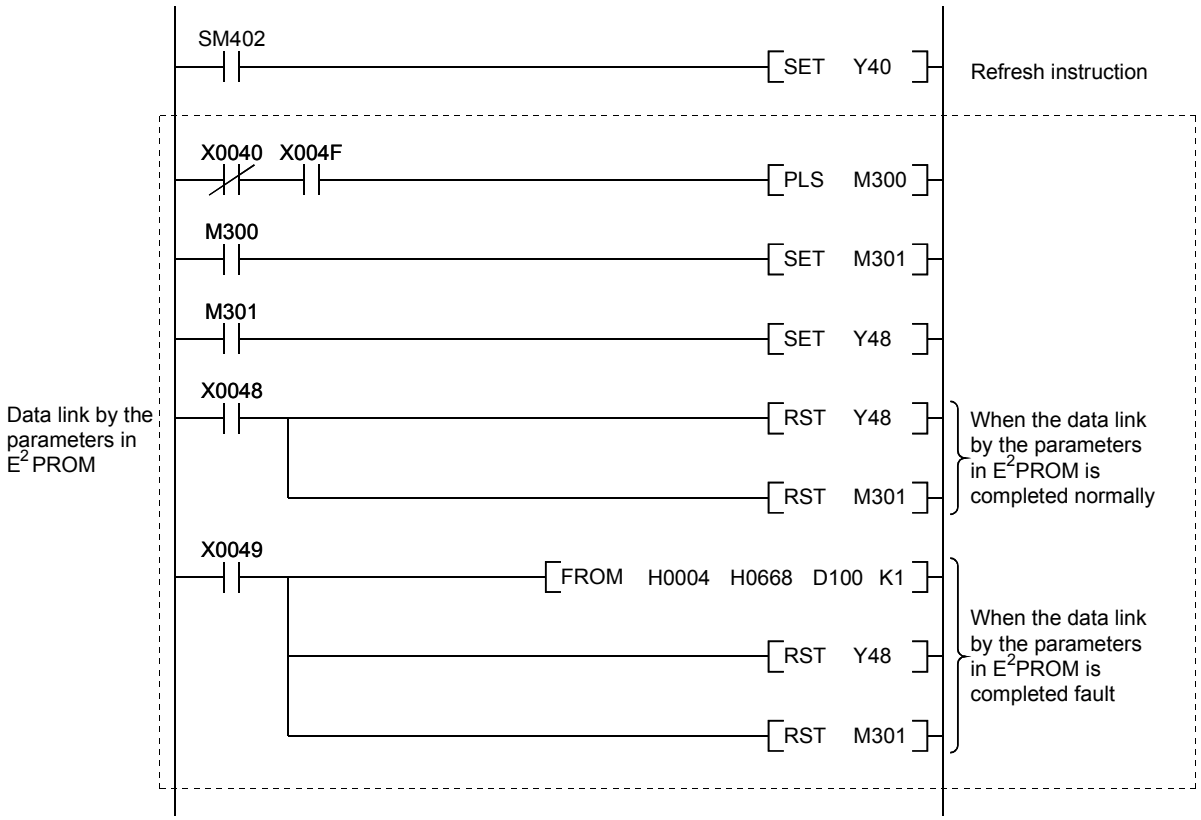
[When debugging]





∗: Refer to Section 8.2 when using the software version E (manufactured in Aug., 2001) or later of the A1SJ61QBT11.

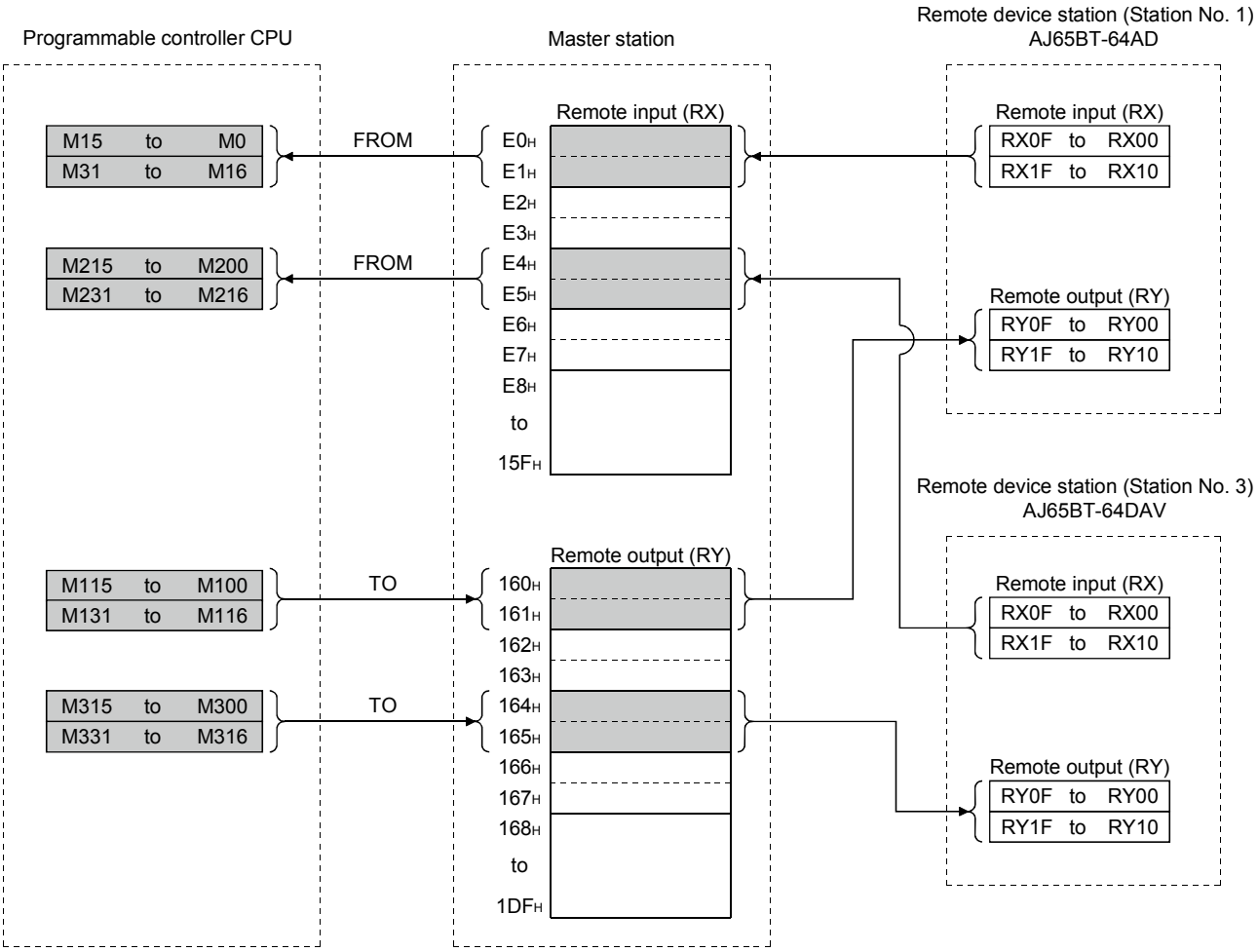
[During operation]



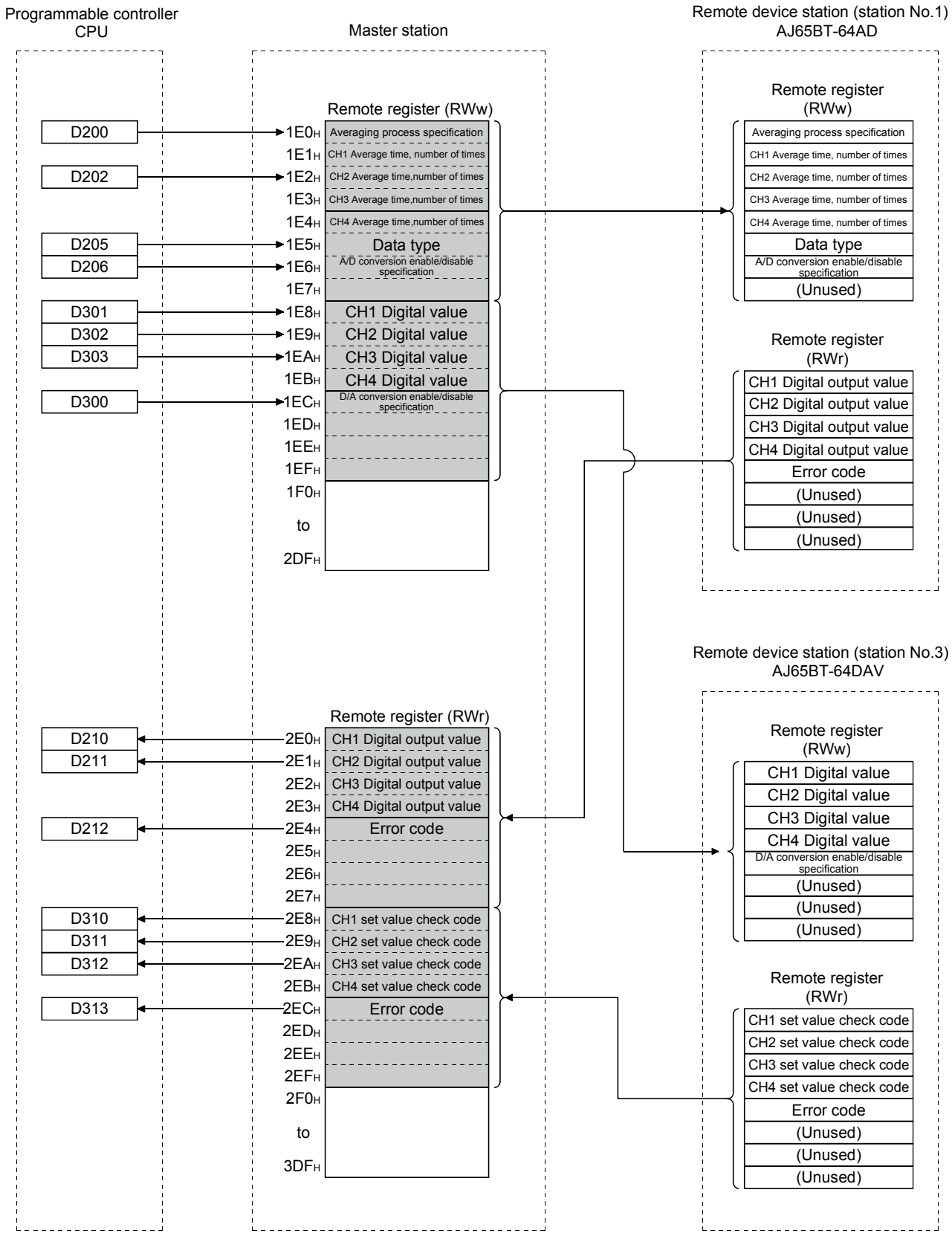
10.2.2 Communication program

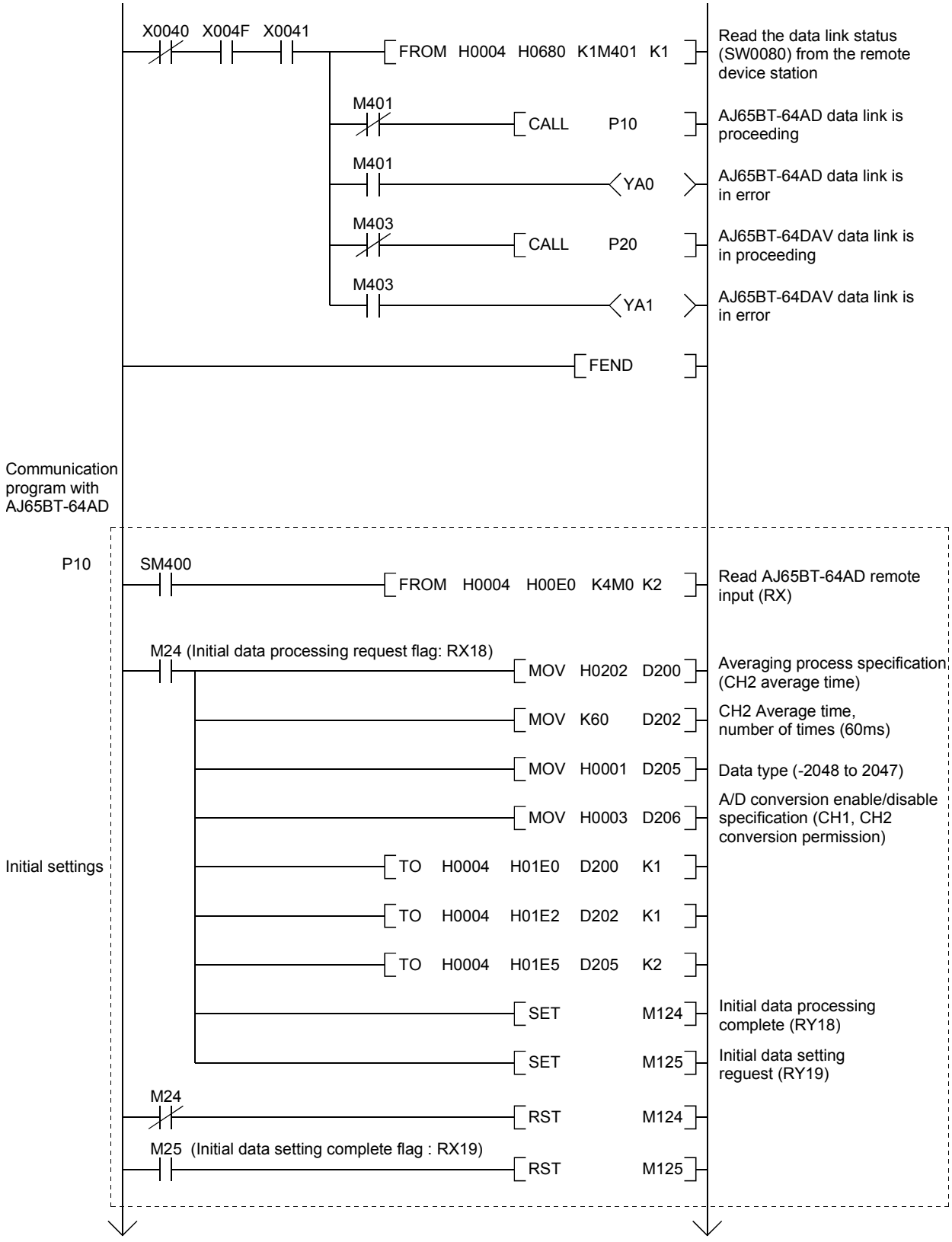
A program to control the remote device stations is shown below.
The following configuration of the programmable controller CPU, master station's buffer memory and the remote device stations is assumed.
For details of each device station, refer to the user's manual of each module.

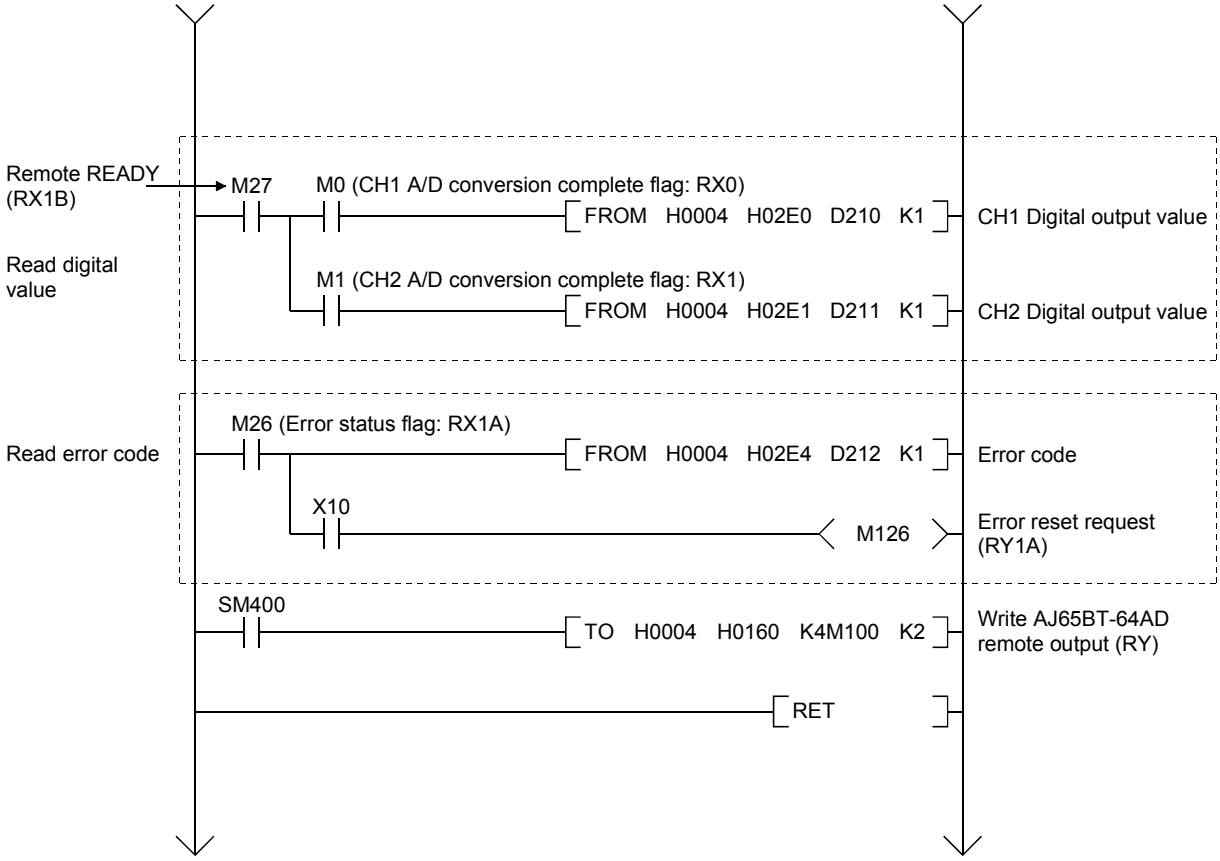
[Remote input (RX), remote output (RY)]

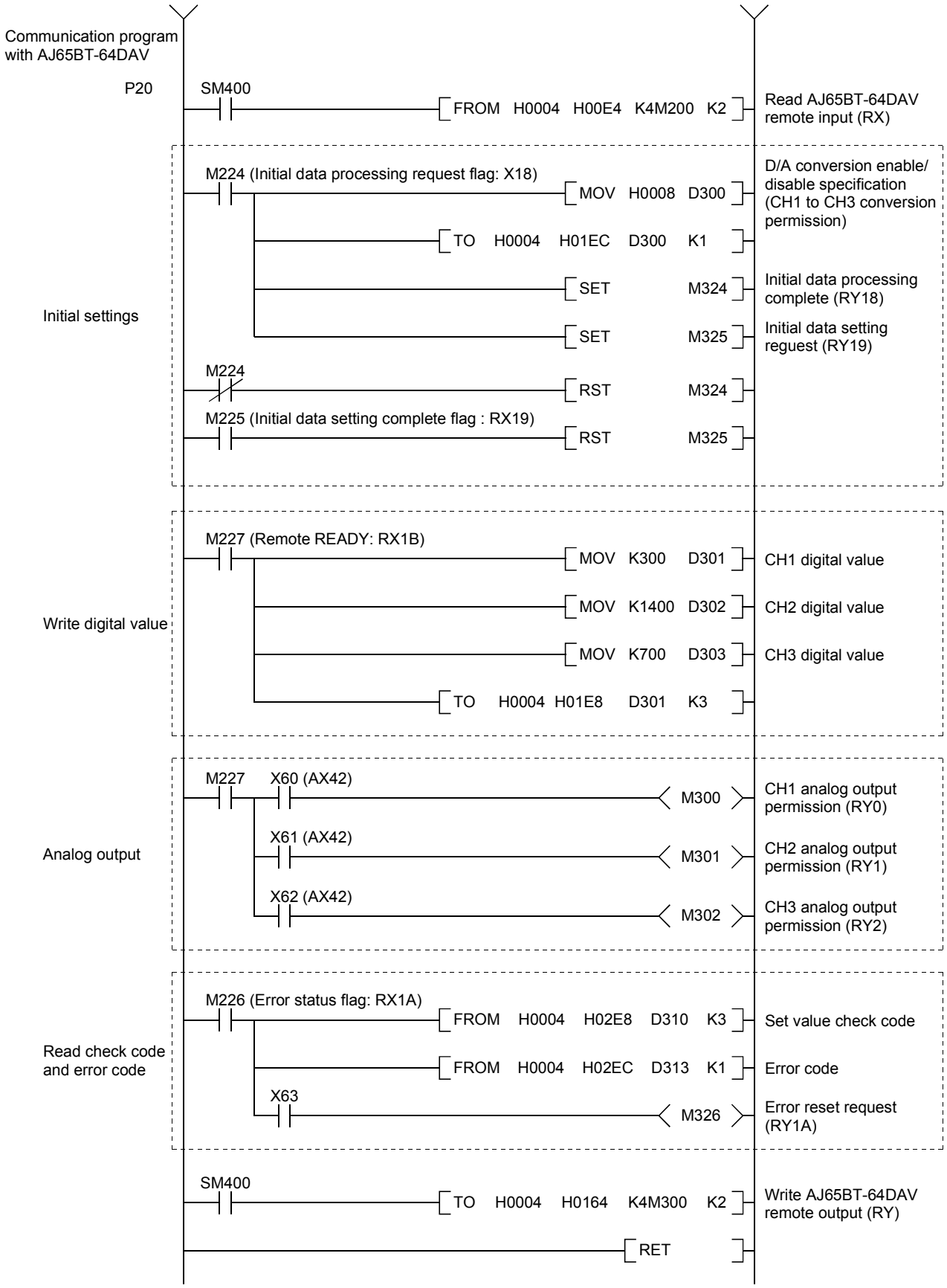


[Remote register (RWw, RWr)]




X0040 X004F X0041
FROM H0004 H0680 K1M401 K1
Read the data link status (SW0080) from the remote device station
M401
CALL P10
AJ65BT-64AD data link is proceeding
M401
YA0
AJ65BT-64AD data link is in error
M403
CALL P20
AJ65BT-64DAV data link is in proceeding
M403
YA1
AJ65BT-64DAV data link is in error
FEND
Communication program with AJ65BT-64AD
P10
SM400
FROM H0004 H00E0 K4M0 K2
Read AJ65BT-64AD remote input (RX)
M24 (Initial data processing request flag: RX18)
MOV H0202 D200
Averaging process specification (CH2 average time)
MOV K60 D202
CH2 Average time, number of times (60ms)
MOV H0001 D205
Data type (-2048 to 2047)
MOV H0003 D206
A/D conversion enable/disable specification (CH1, CH2 conversion permission)
Initial settings
TO H0004 H01E0 D200 K1
TO H0004 H01E2 D202 K1
TO H0004 H01E5 D205 K2
SET M124
Initial data processing complete (RY18)
SET M125
Initial data setting reguest (RY19)
M24
RST M124
M25 (Initial data setting complete flag : RX19)
RST M125


Remote READY (RX1B)
M27
M0 (CH1 A/D conversion complete flag: RX0)
FROM H0004 H02E0 D210 K1
CH1 Digital output value
Read digital value
M1 (CH2 A/D conversion complete flag: RX1)
FROM H0004 H02E1 D211 K1
CH2 Digital output value
Read error code
M26 (Error status flag: RX1A)
FROM H0004 H02E4 D212 K1
Error code
X10
M126
Error reset request (RY1A)
SM400
TO H0004 H0160 K4M100 K2
Write AJ65BT-64AD remote output (RY)
RET


Communication program with AJ65BT-64DAV
P20
SM400
FROM H0004 H00E4 K4M200 K2
Read AJ65BT-64DAV remote input (RX)
Initial settings
M224 (Initial data processing request flag: X18)
MOV H0008 D300
D/A conversion enable/ disable specification (CH1 to CH3 conversion permission)
TO H0004 H01EC D300 K1
SET M324
Initial data processing complete (RY18)
SET M325
Initial data setting reguest (RY19)
M224
RST M324
M225 (Initial data setting complete flag : RX19)
RST M325
Write digital value
M227 (Remote READY: RX1B)
MOV K300 D301
CH1 digital value
MOV K1400 D302
CH2 digital value
MOV K700 D303
CH3 digital value
TO H0004 H01E8 D301 K3
Analog output
M227
X60 (AX42)
M300
CH1 analog output permission (RY0)
X61 (AX42)
M301
CH2 analog output permission (RY1)
X62 (AX42)
M302
CH3 analog output permission (RY2)
Read check code and error code
M226 (Error status flag: RX1A)
FROM H0004 H02E8 D310 K3
Set value check code
FROM H0004 H02EC D313 K1
Error code
X63
M326
Error reset request (RY1A)
SM400
TO H0004 H0164 K4M300 K2
Write AJ65BT-64DAV remote output (RY)
RET

10.3 Performing the Data Link

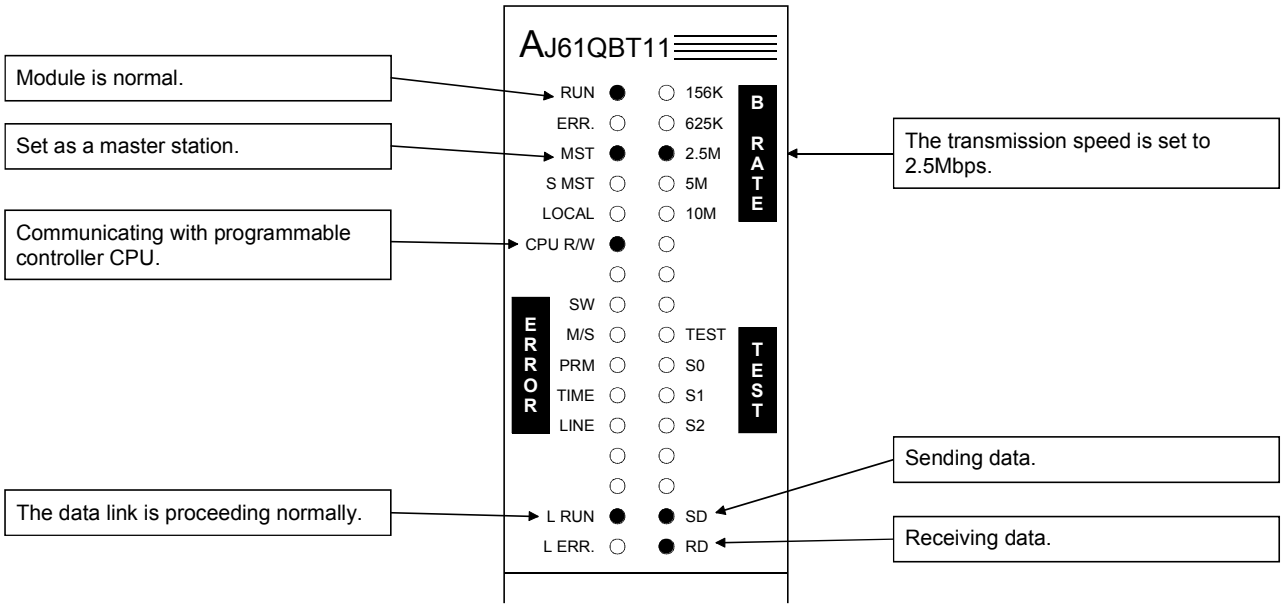
Turn on the power supply of the remote device station first, then the power supply of the master station to start the data link.

10.3.1 Confirming the operation by LED display

The following diagram shows the LED display status of the master station and the remote I/O station when the data link is performed normally.

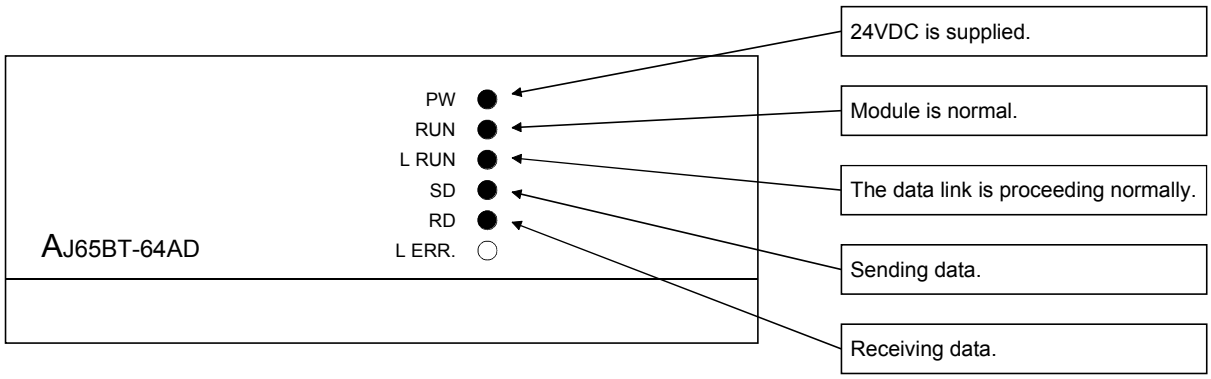
(1) LED display of the master station

Confirm that the LED display shows the following status:



(2) LED display of the remote device station

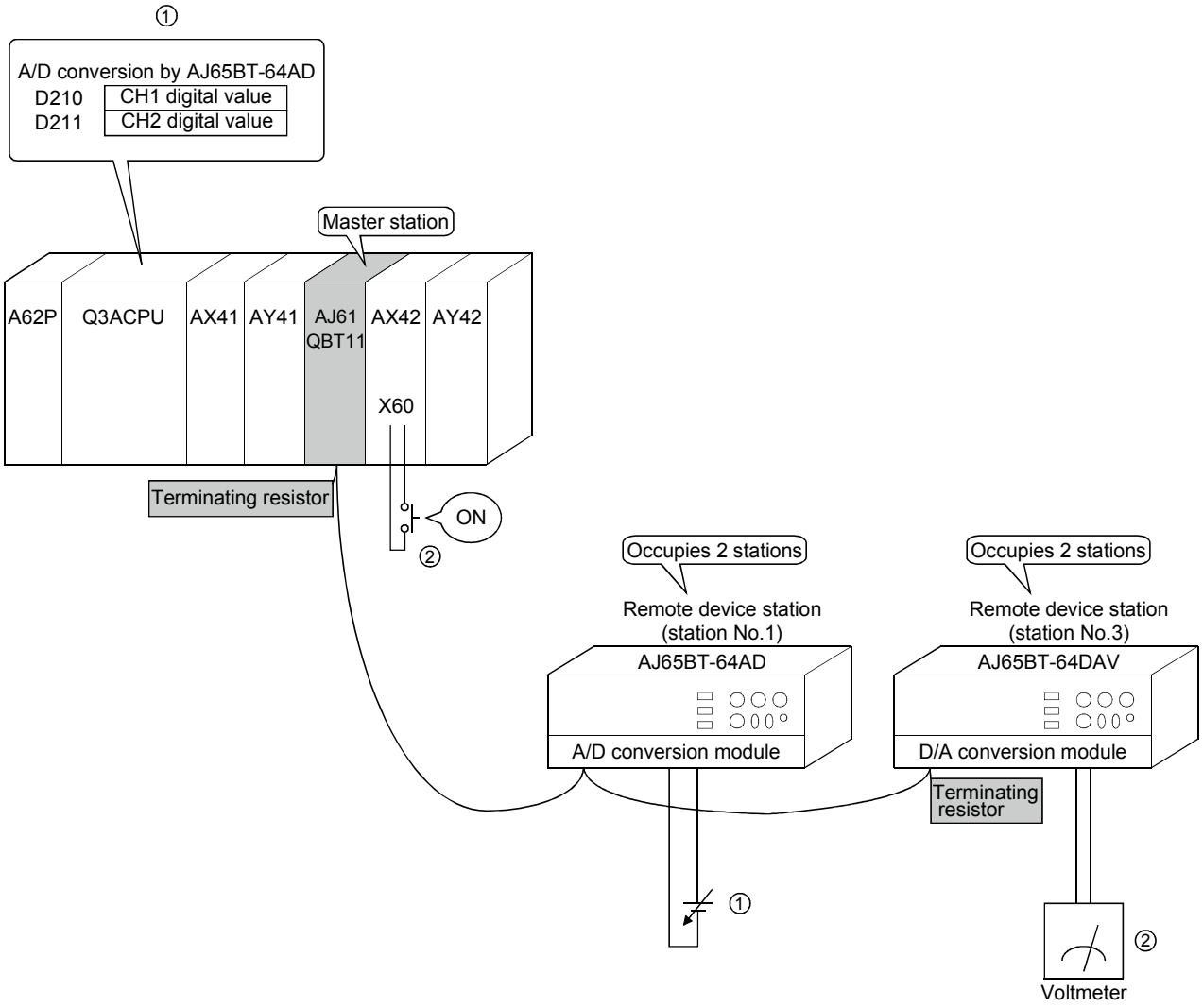
Confirm that the LED display shows the following status:
The LED display in AJ65BT-64AD and AJ65BT-64DAV are the same.



10.3.2 Confirming the operation by the program

Using the sequence program, confirm that the data link is proceeding normally.

① The digital value which was converted by AJ65BT-64AD is stored in D210 (CH1 digital value) and D211 (CH2 digital value).
② When X60 is turned on, the output voltage appears on CH1 of AJ65BT-64DAV.



MEMO

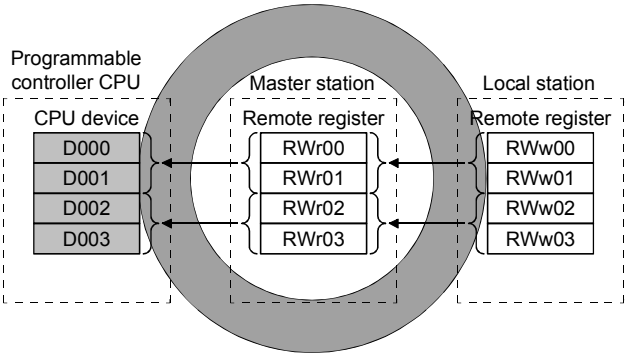
11. COMMUNICATION BETWEEN THE MASTER STATION AND THE LOCAL STATION

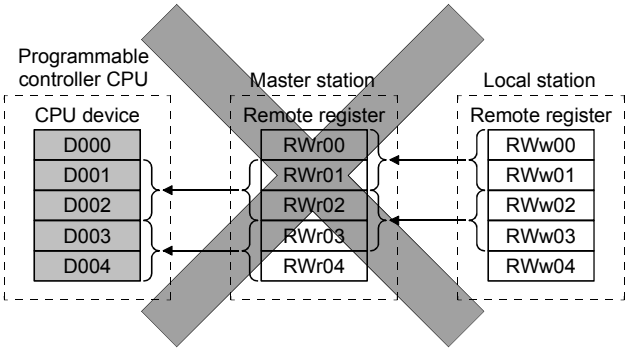
How to set, program, and confirm the operation of the module is described using a system configuration example.

11.1 Secured 32-bit Data

When the following conditions, 1) and 2) are satisfied in the CC-Link network, 32-bit data in remote registers (RWr/RWw) between a programmable controller CPU and a master/local station can be secured.

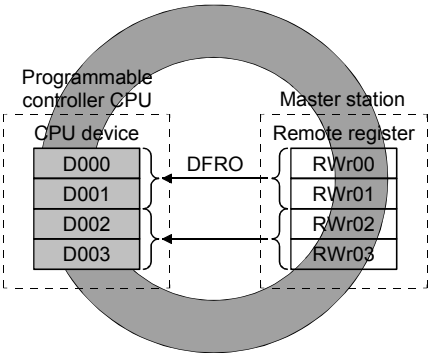
1) Access starts from a remote register (RWr/RWw) address of an "even number".

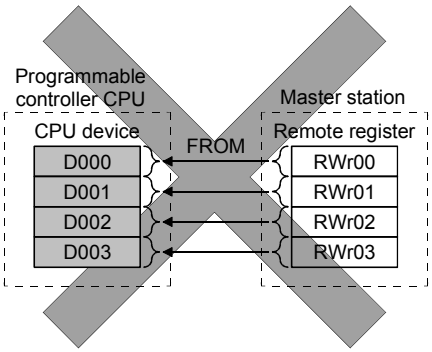




* Because the start address on the remote register side is an "odd address", new and old data may be mixed in 16-bit (1-word) units.

2) Access by the sequence program must be made in units of even points.

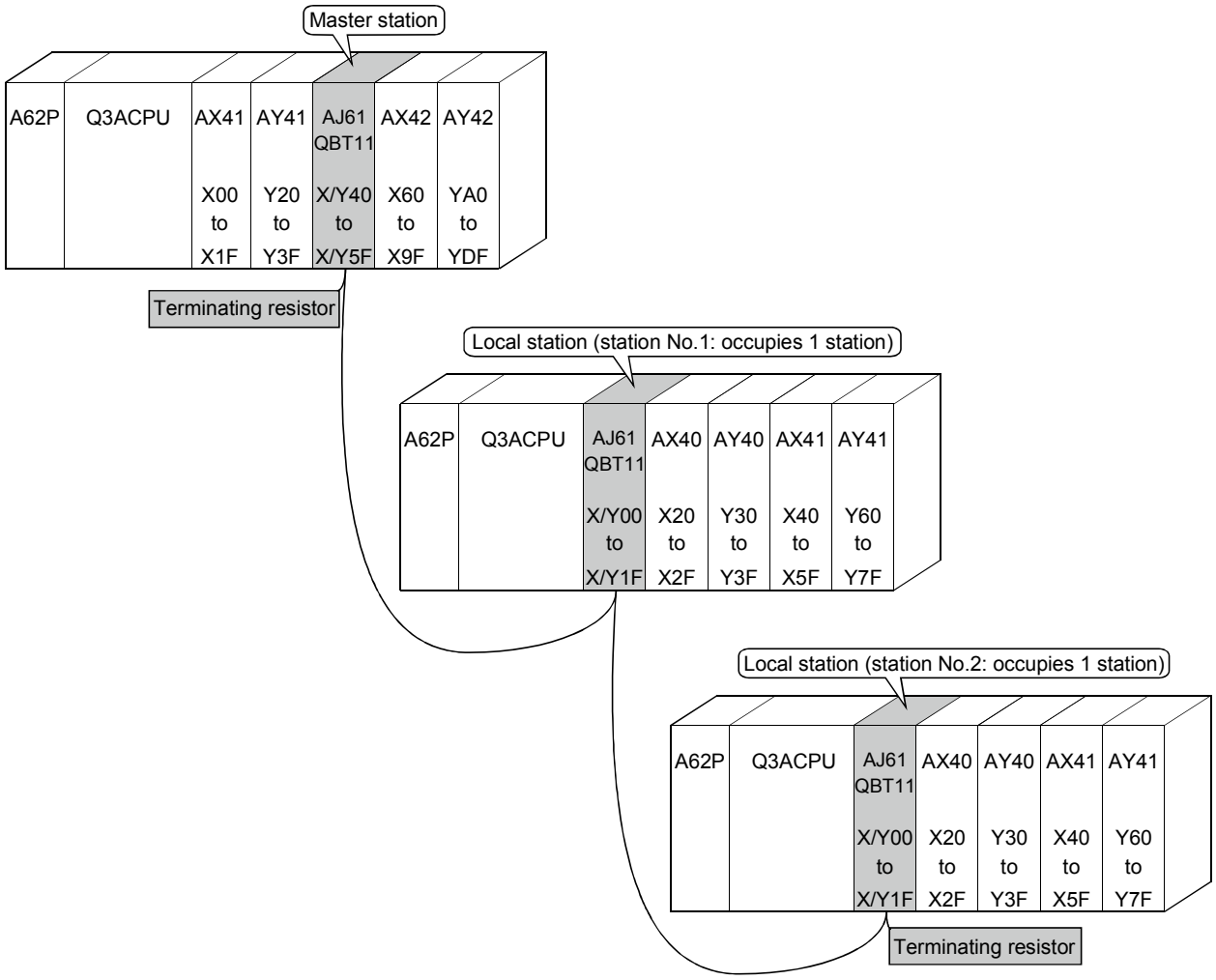




* Because the access is made for each single point (1-word), new and old data may be mixed in 16-bit (1-word) units.

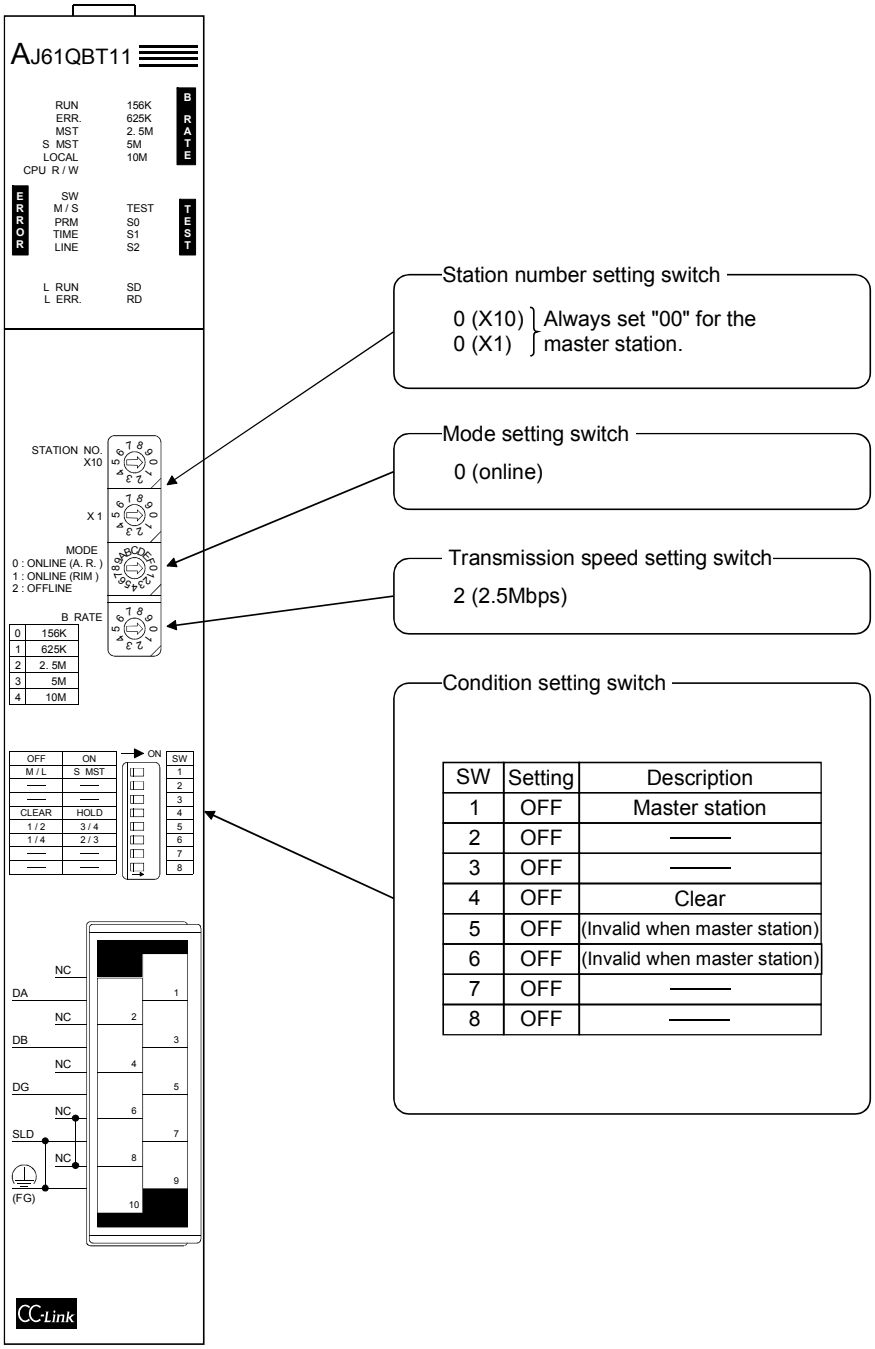
11.2 System Configuration

A system with two local stations is connected as an example.



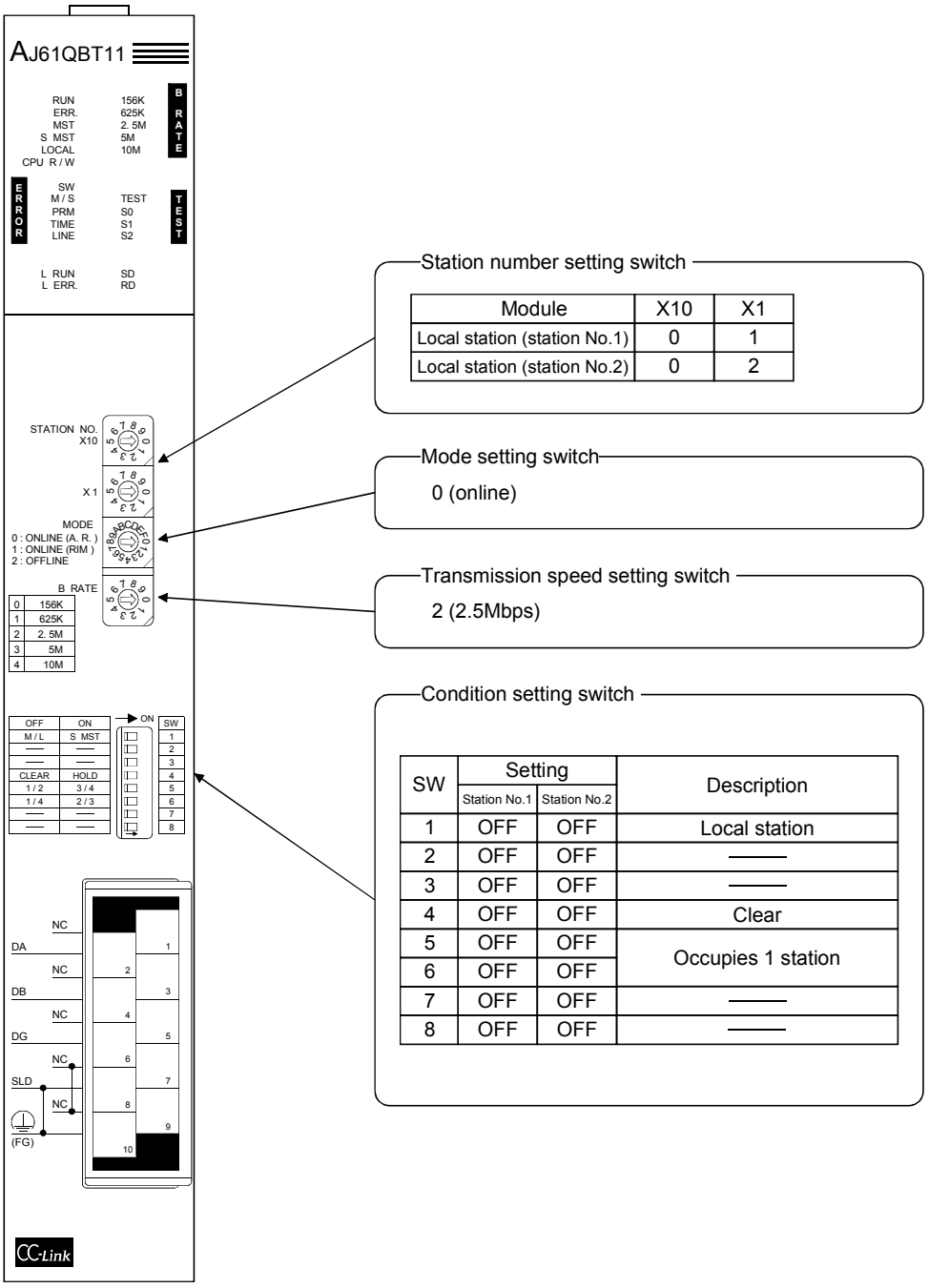
11.2.1 Setting of the master station

The settings of the switches on the master station are shown below:



11.2.2 Setting of the local station

The settings of the switches on the local station are shown below:



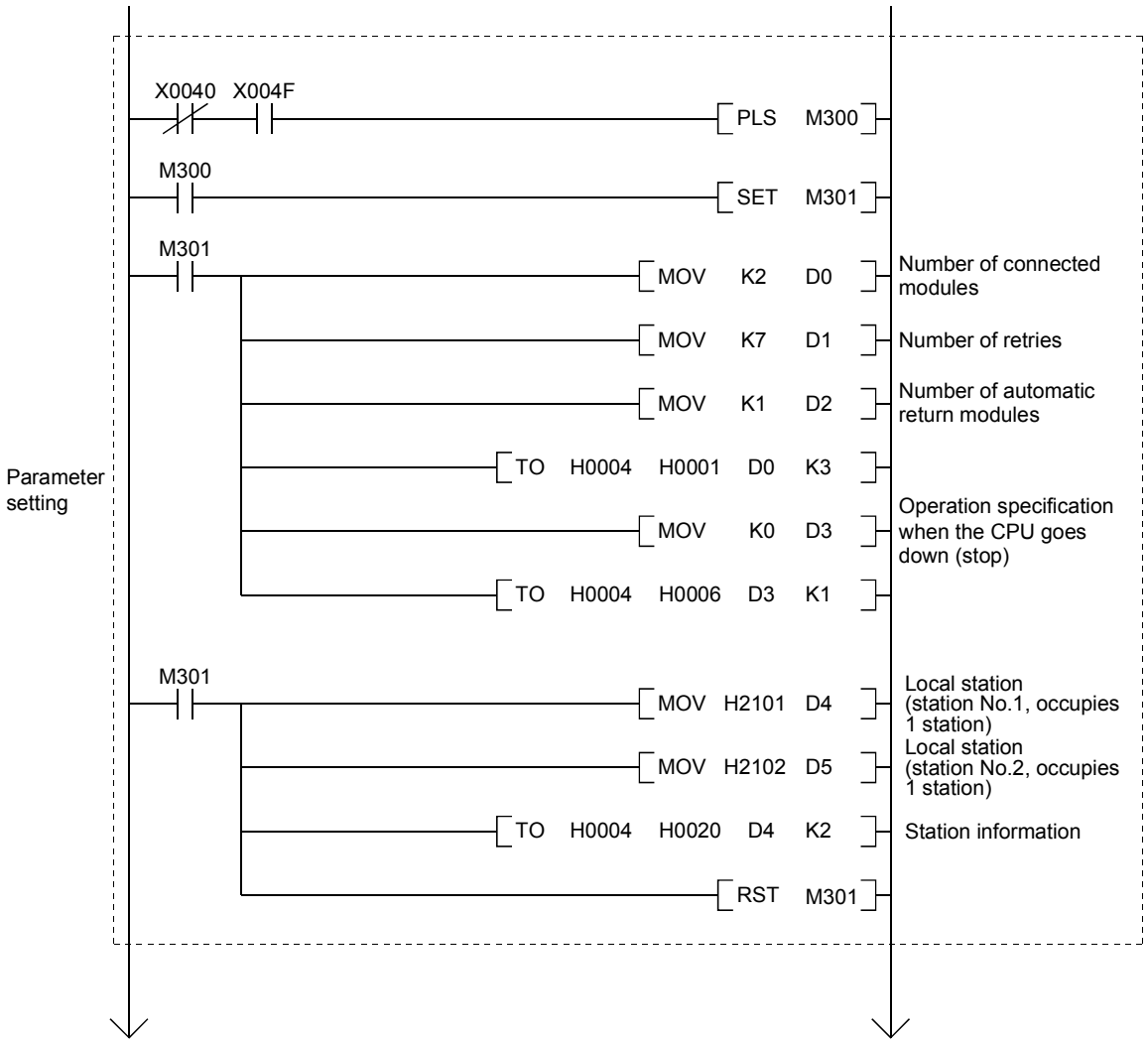
11.3 Creating a Program

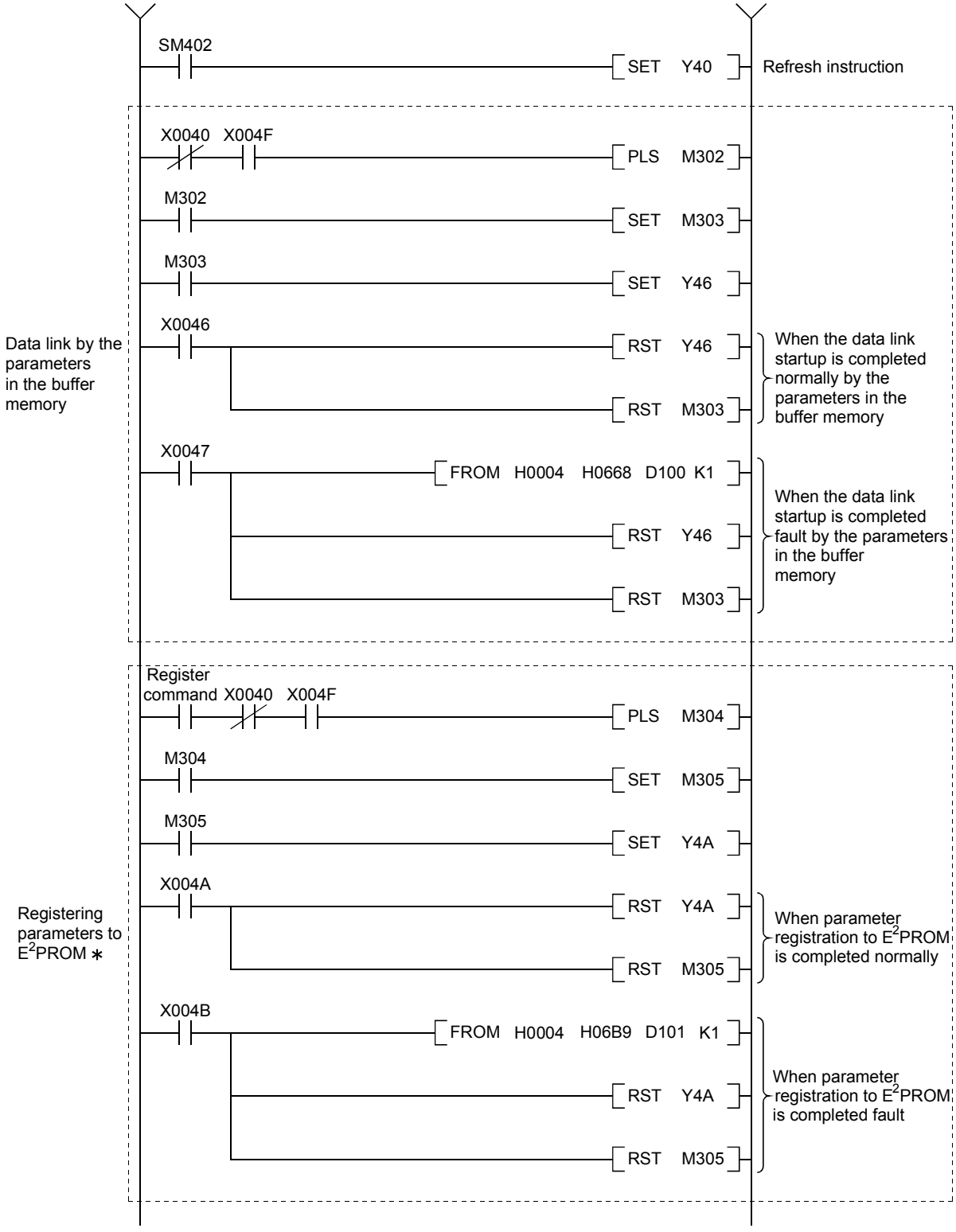
11.3.1 Program for the master station

(1) Program for parameter

This program automatically initiates the data link when the programmable controller CPU starts running.

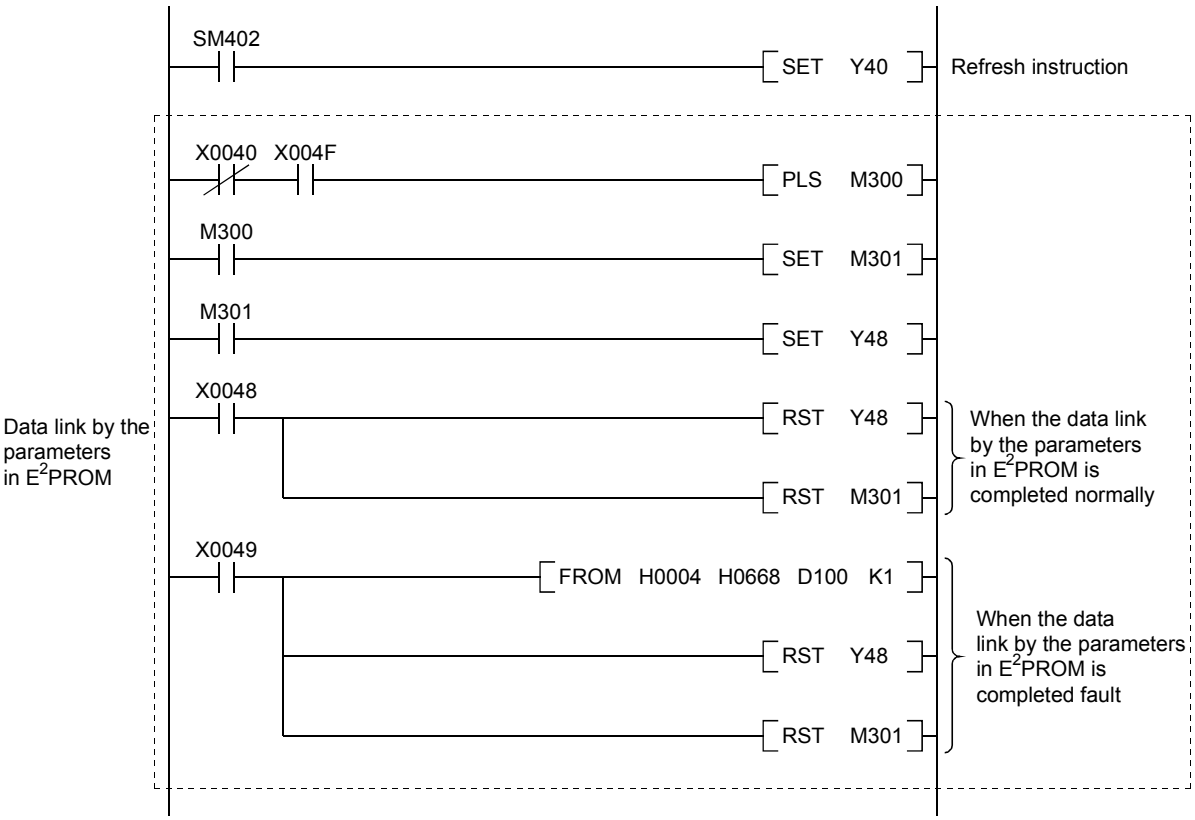
[When debugging]





∗: Refer to Section 8.2 when using the software version E (manufactured in Aug., 2001) or later of the A1SJ61QBT11.

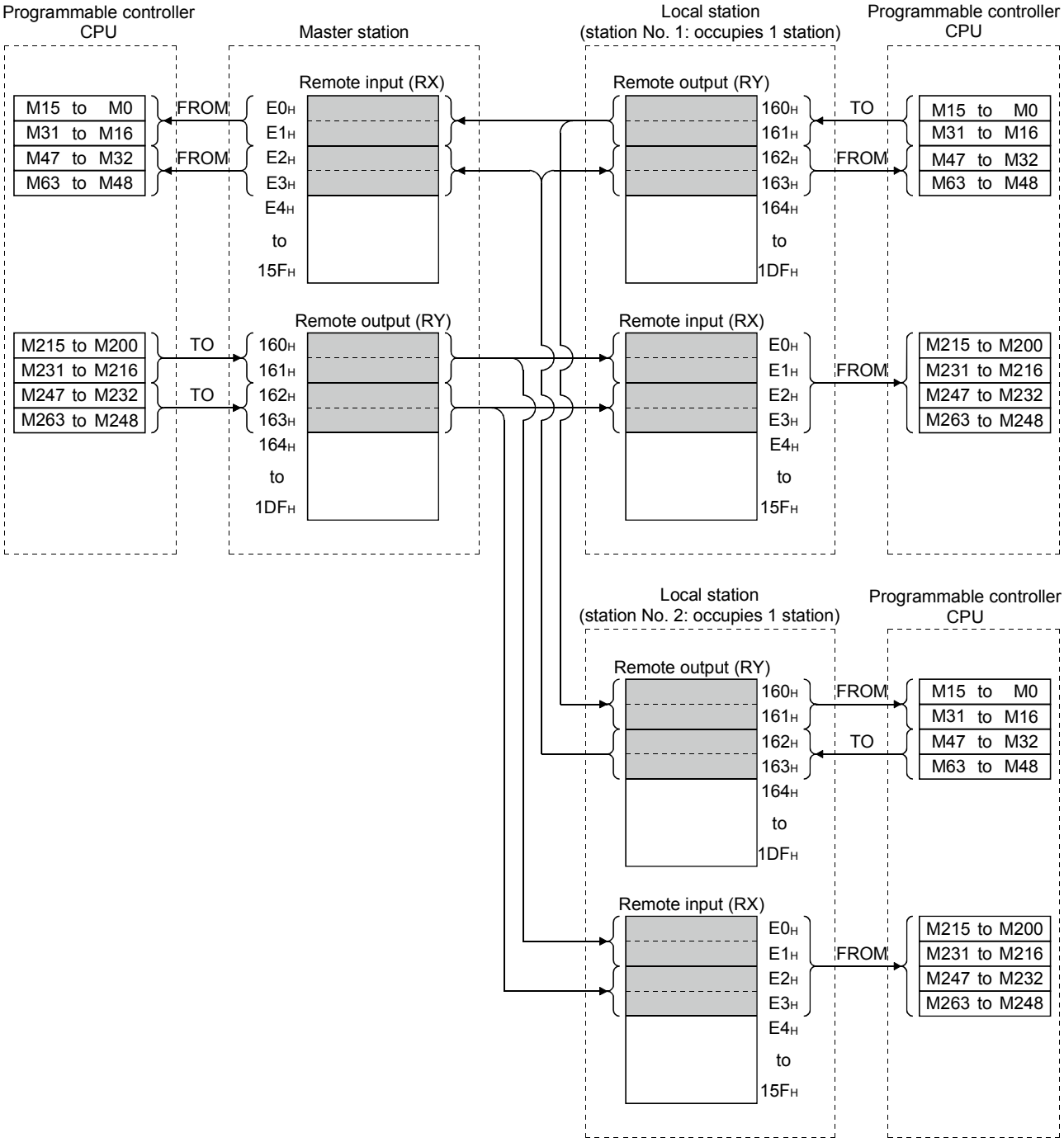
[During operation]



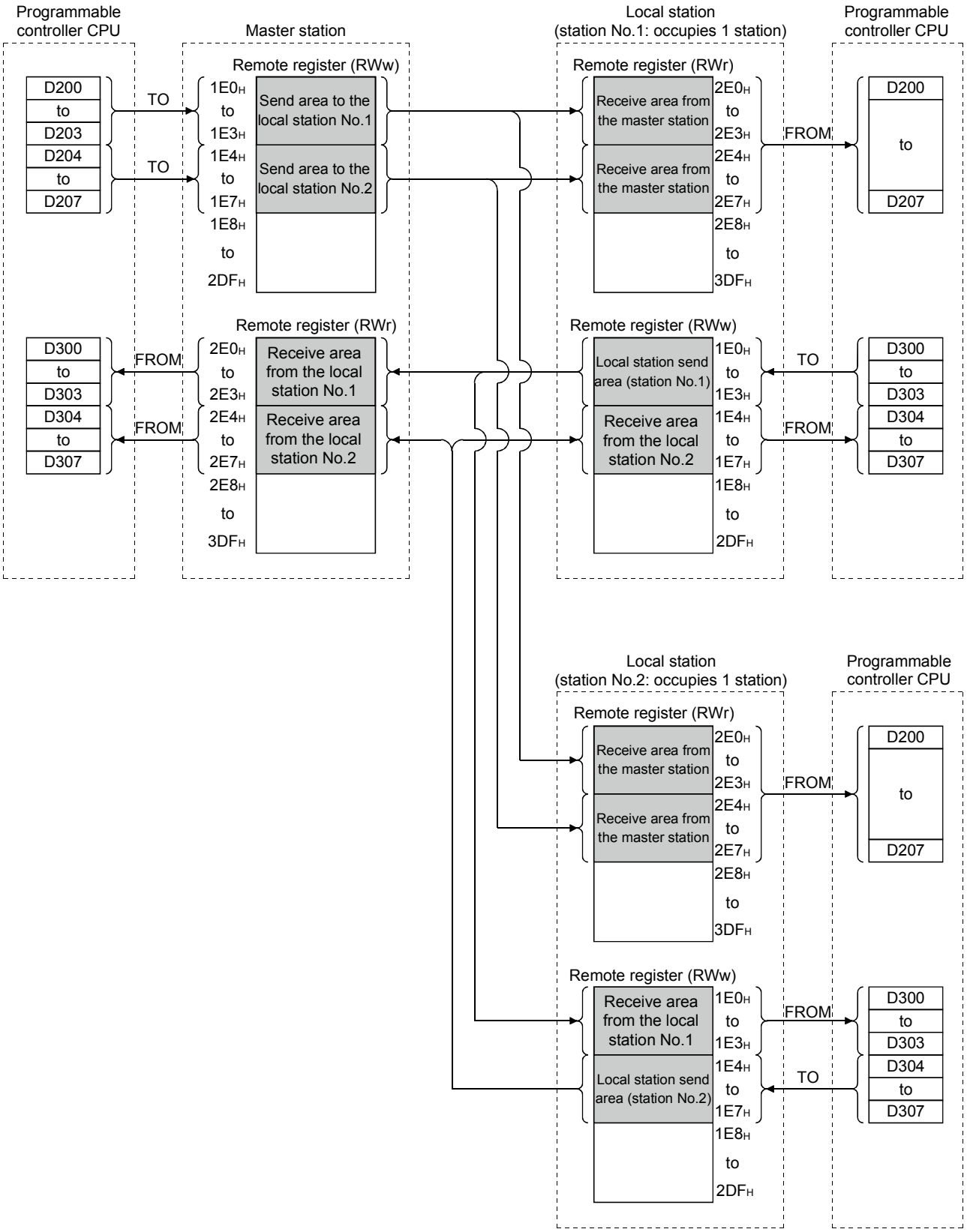
(2) Communication program

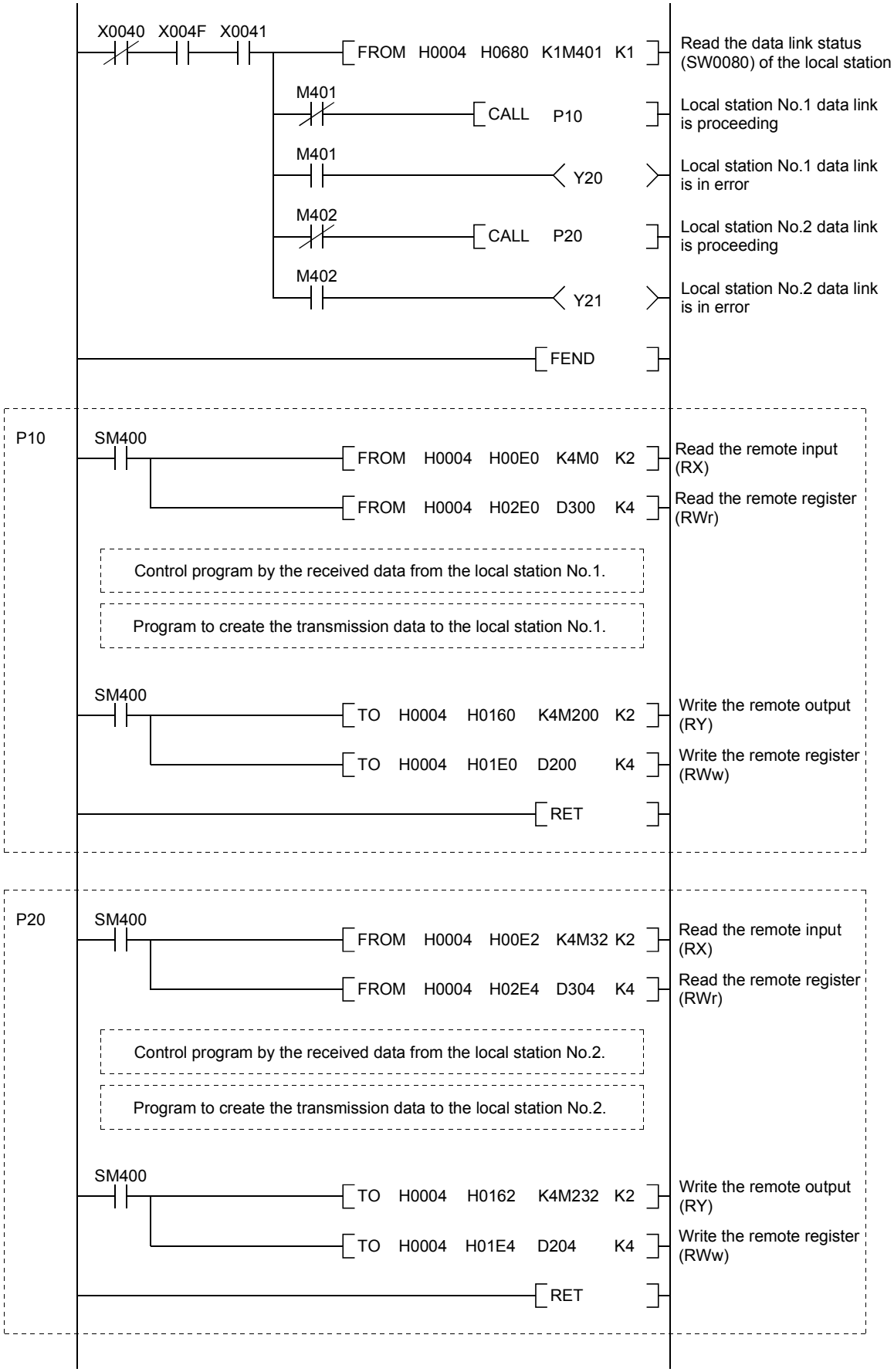
The following configuration of the programmable controller CPU device, master station's buffer memory and local station's buffer memory is assumed.

[Remote input (RX), remote output (RY)]



[Remote register (RWw, RWr)]




X0040 X004F X0041
FROM H0004 H0680 K1M401 K1
Read the data link status (SW0080) of the local station
M401
CALL P10
Local station No.1 data link is proceeding
M401
Y20
Local station No.1 data link is in error
M402
CALL P20
Local station No.2 data link is proceeding
M402
Y21
Local station No.2 data link is in error
FEND
P10
SM400
FROM H0004 H00E0 K4M0 K2
Read the remote input (RX)
FROM H0004 H02E0 D300 K4
Read the remote register (RWr)
Control program by the received data from the local station No.1.
Program to create the transmission data to the local station No.1.
SM400
TO H0004 H0160 K4M200 K2
Write the remote output (RY)
TO H0004 H01E0 D200 K4
Write the remote register (RWw)
RET
P20
SM400
FROM H0004 H00E2 K4M32 K2
Read the remote input (RX)
FROM H0004 H02E4 D304 K4
Read the remote register (RWr)
Control program by the received data from the local station No.2.
Program to create the transmission data to the local station No.2.
SM400
TO H0004 H0162 K4M232 K2
Write the remote output (RY)
TO H0004 H01E4 D204 K4
Write the remote register (RWw)
RET

11.3.2 Local station program

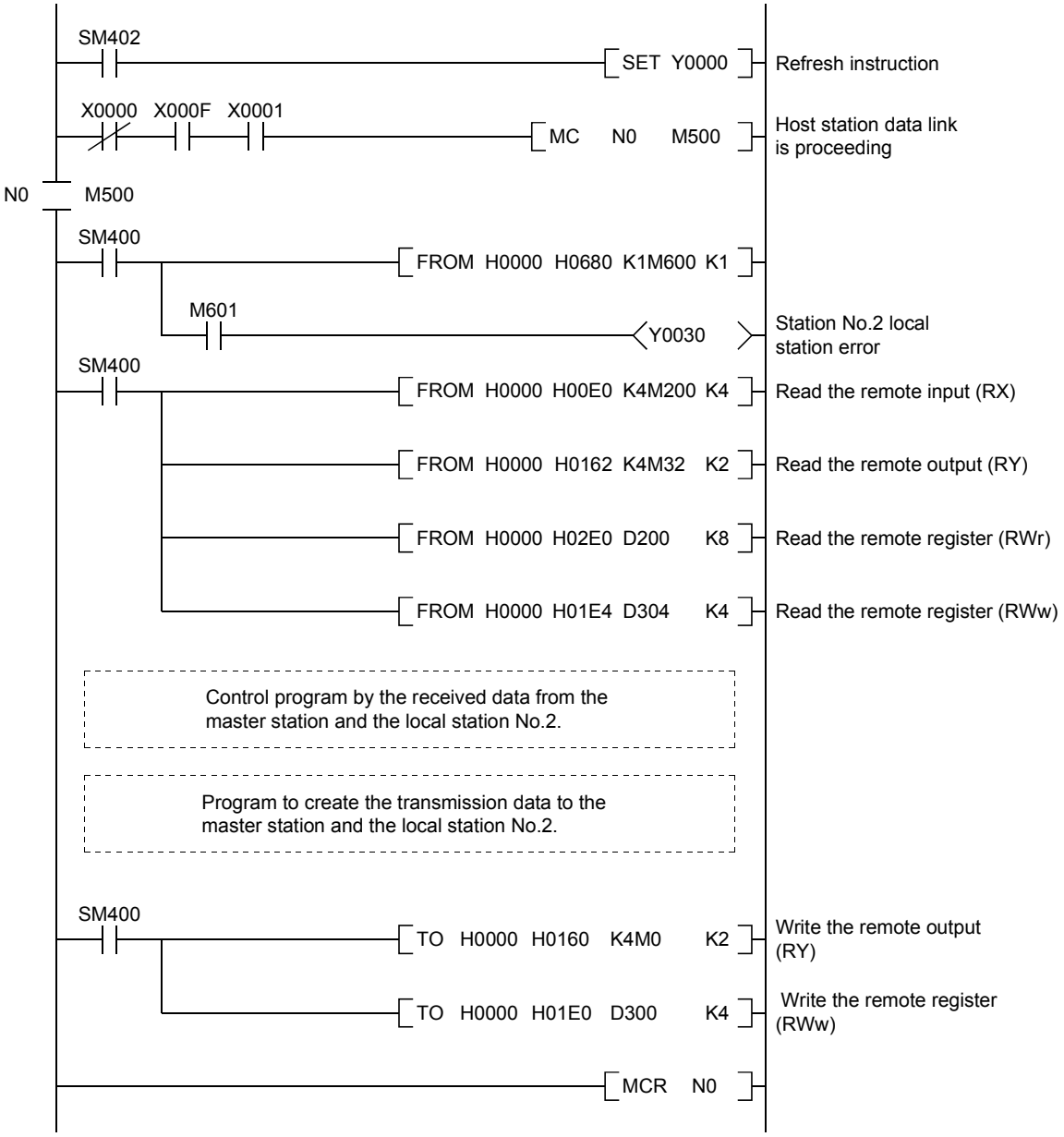
(1) Program for parameters

Local stations do not need this.

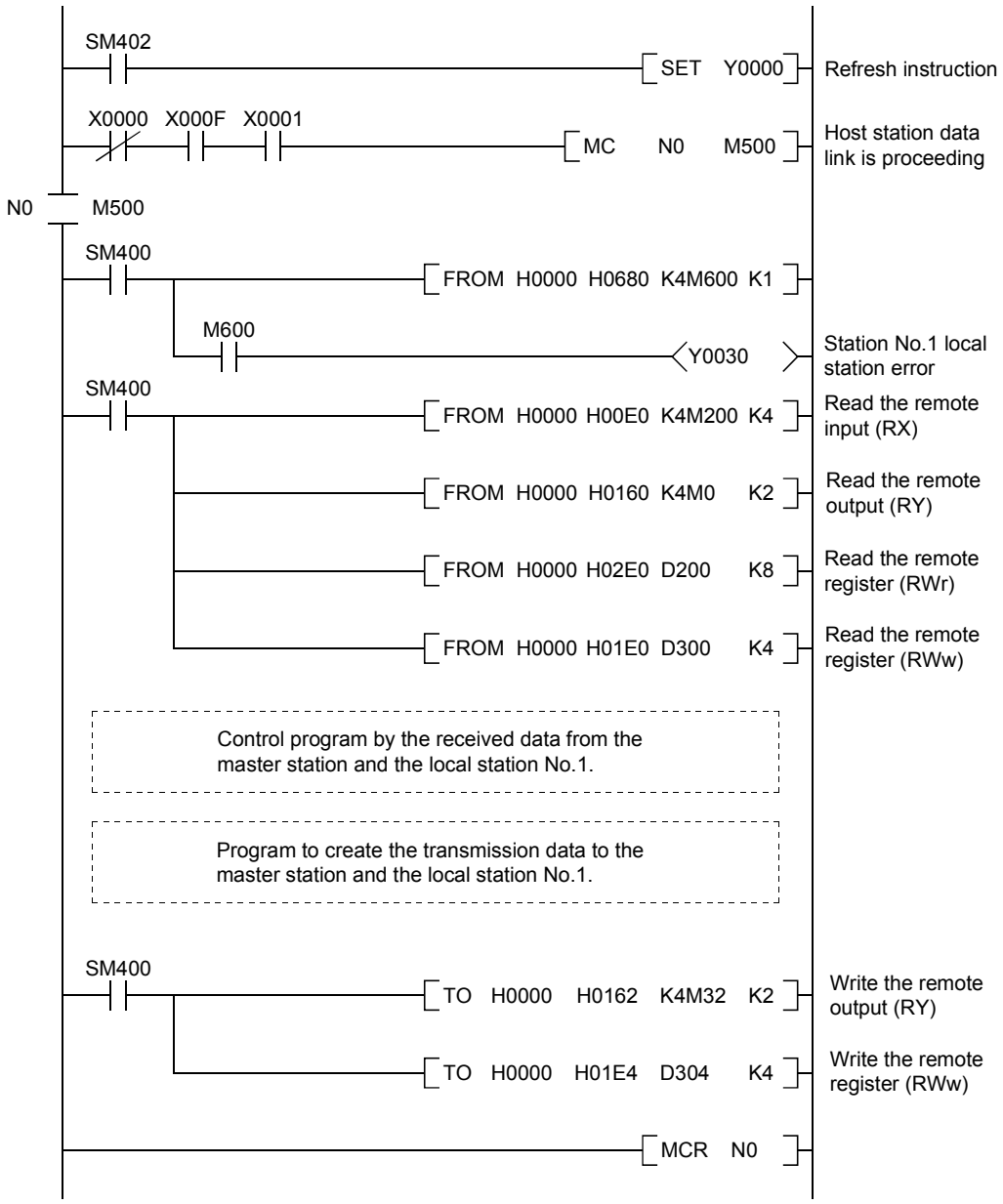
(2) Program for communication

Refer to Section 11.3.1 (2), for the relationship among the programmable controller CPU device, master station's buffer memory, and the local station's buffer memory.

(a) Local station No.1



(b) Local station No.2

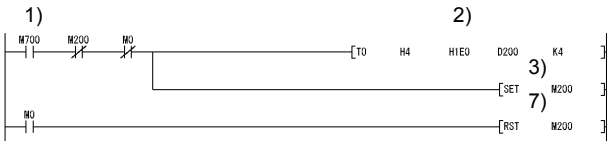


REMARK

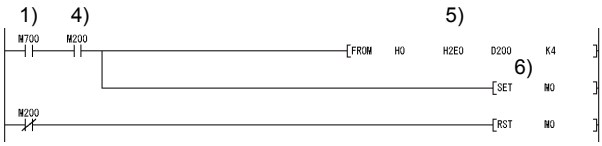
By building an interlock using the remote I/O (RX/RY), data read from/written to each slave station will not be separated between the new and old one.

Configure an interlock with remote I/O (RX/RY) as shown in the following example.

Sending station (master station)



Receiving station (local station)



1) The send/receive command (M700) turns ON.
2) Data of D200 to D203 are stored in RWw0 to RWw3.
3) Upon completion of storage in RWw0 to RWw3, M200 (RY00) for handshake turns ON.＊1
4) By cyclic transmission, remote output (RY) data are sent following the remote register (RWw) data, and the receiving station's M200 (RX00) turns ON.
5) Data of RWr0 to RWr3 are stored in D200 to D203.
6) Upon completion of storage in D200 to D203, M0 (RY00) for handshake turns ON.＊1
7) When the data transmission to the receiving station is complete, M200(RY00) turns OFF.

＊1 When a handshake is performed for one bit of the remote I/O (RX/RY) in a station with the number of occupied stations of two or more, the integrity of cyclic data is assured per slave station.
An interlock for the number of occupied stations (in units of four words) is not required.

11.4 Performing the Data Link

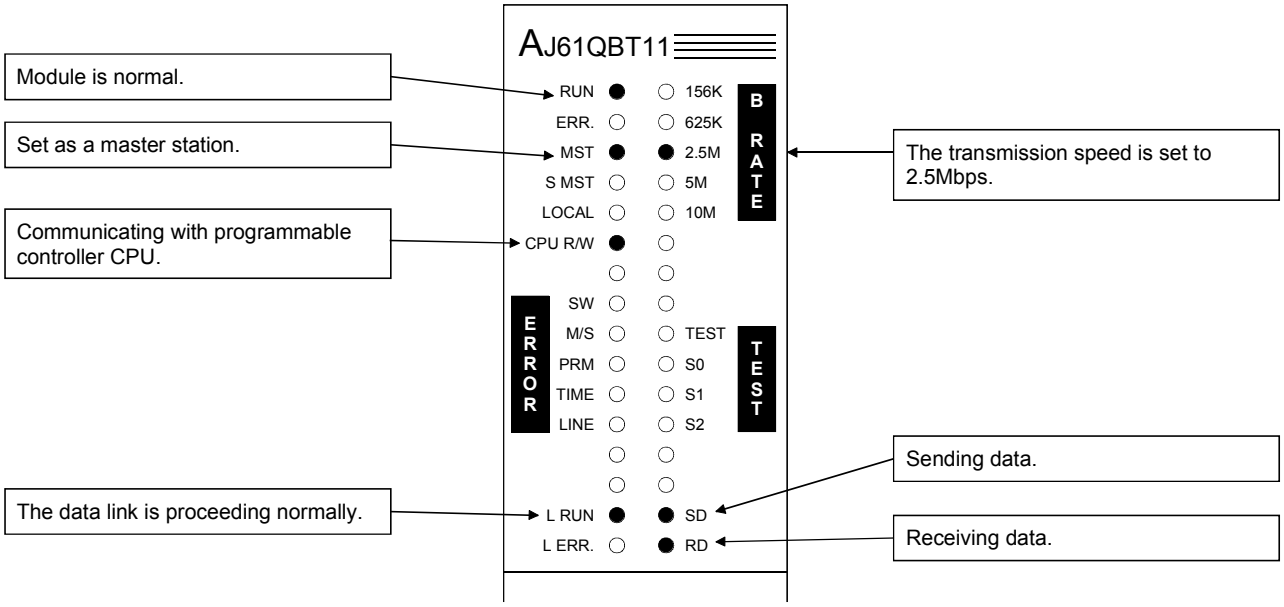
Turn on the power supply of the local station first, then the power supply of the master station to start the data link.

11.4.1 Confirming the operation by LED display

The following diagram shows the LED display status of the master station and the local station when the data link is performed normally.

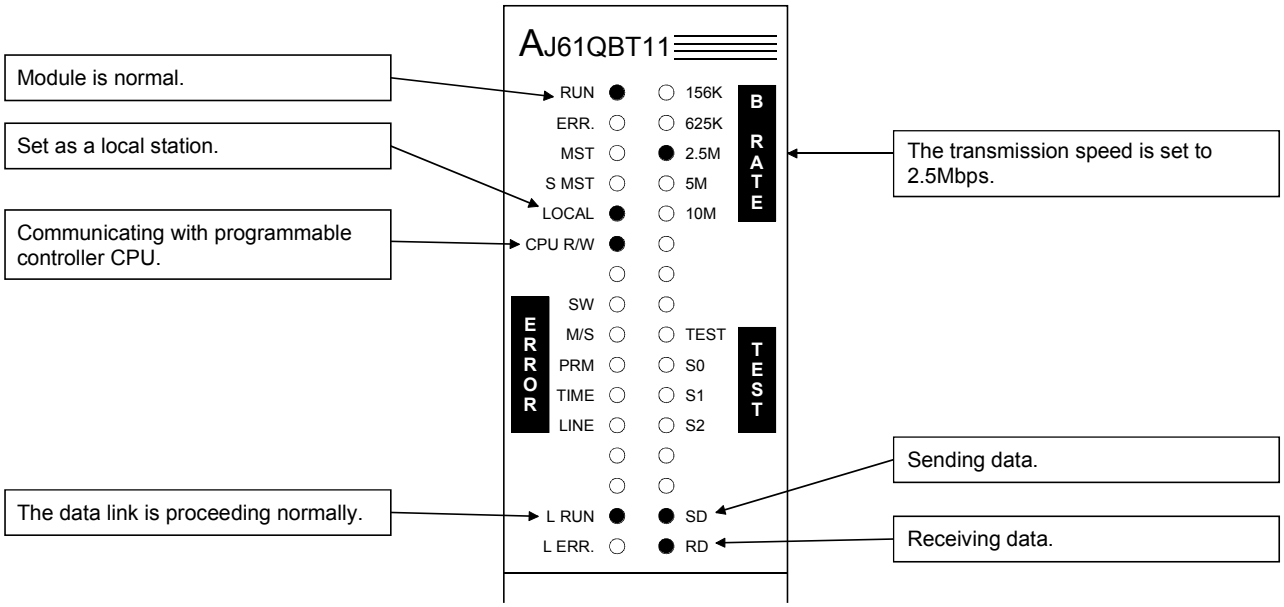
(1) LED display of the master station

Confirm that the LED display shows the following status:



(2) LED display of the local station

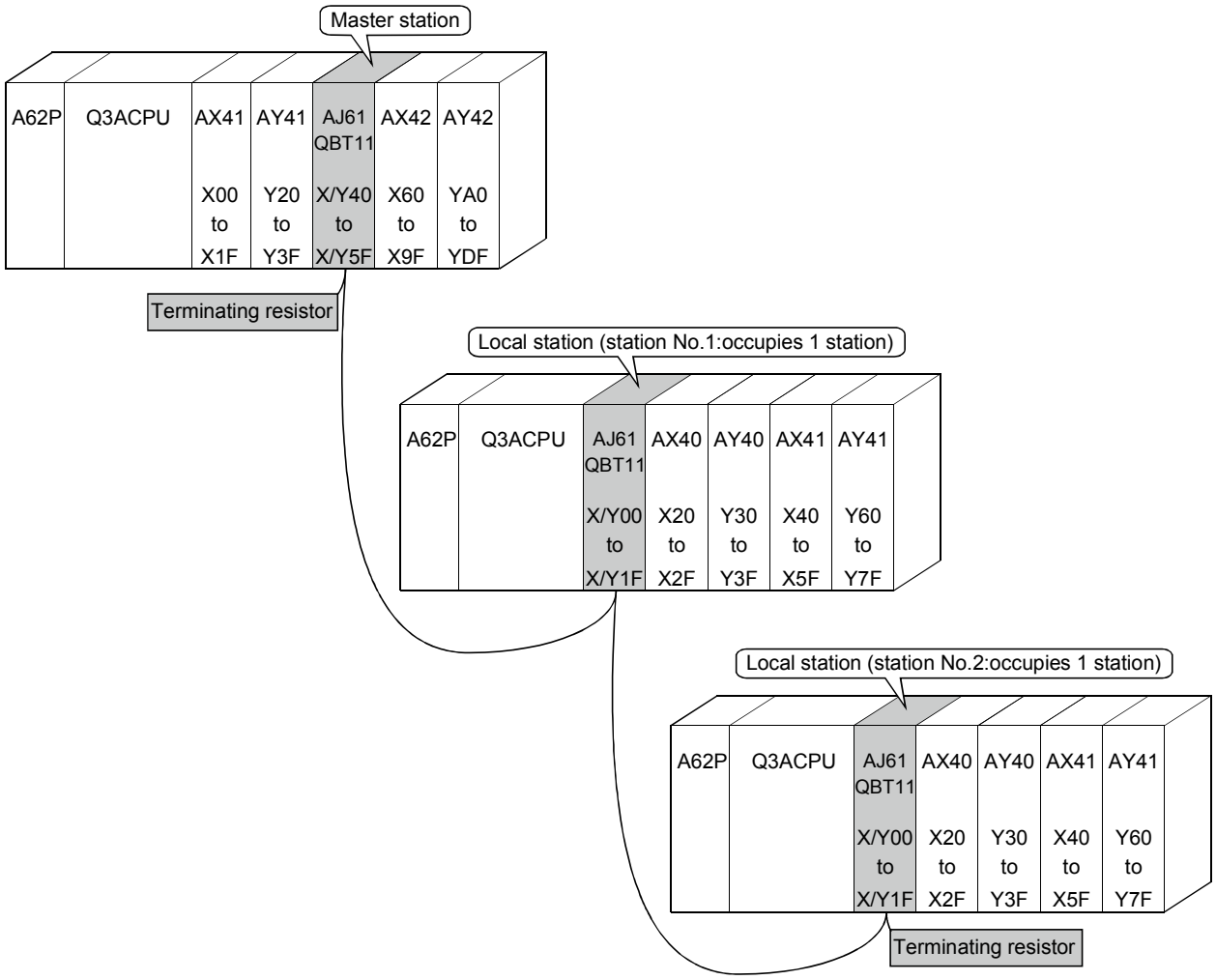
Confirm that the LED display shows the following status:



11.4.2 Confirming the operation by the program

Using the sequence program, confirm that the data link is proceeding normally.

① When M200 of the master station is turned on, M200 of the local station No.1 and the local station No.2 are turned on.
② When M0 of the local station No.1 is turned on, M0 of the master station and the local station No.2 are turned on.
③ When M32 of the local station No.2 is turned on, M32 of the master station and the local station No.1 are turned on.
④ When the data is written into D200 of the master station, it is stored in D200 of the local station No.1 and station No.2.
⑤ When the data is written into D300 of the local station No.1, it is stored in D300 of the master station and the local station No.2.
⑥ When the data is written into D304 of the local station No.2, it is stored in D304 of the master station and the local station No.1.



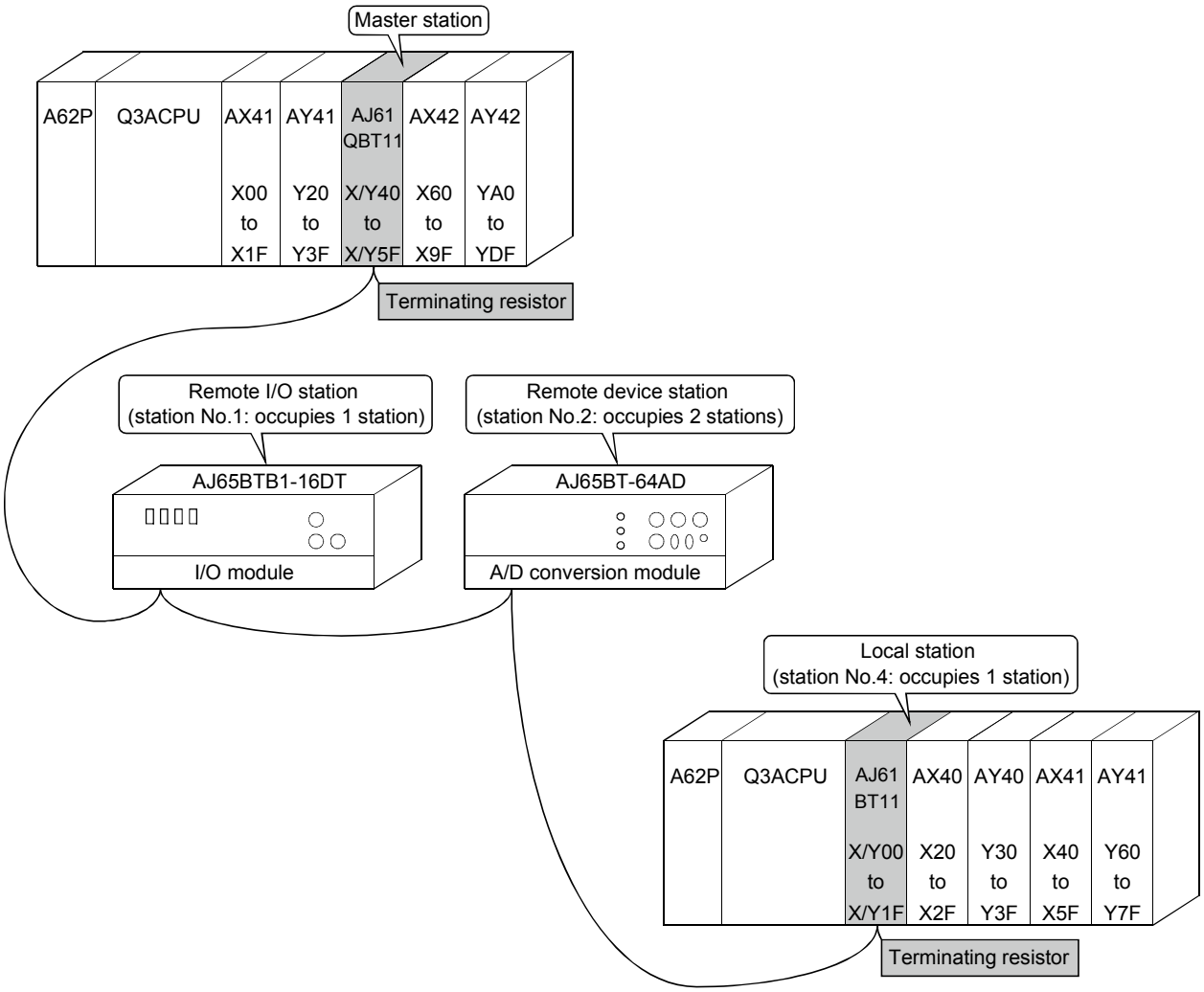
MEMO

12. COMMUNICATION IN THE COMPOUND SYSTEM

How to set, program, and confirm the operation of the module in a system where the remote I/O station, remote device station and local station coexist is described.

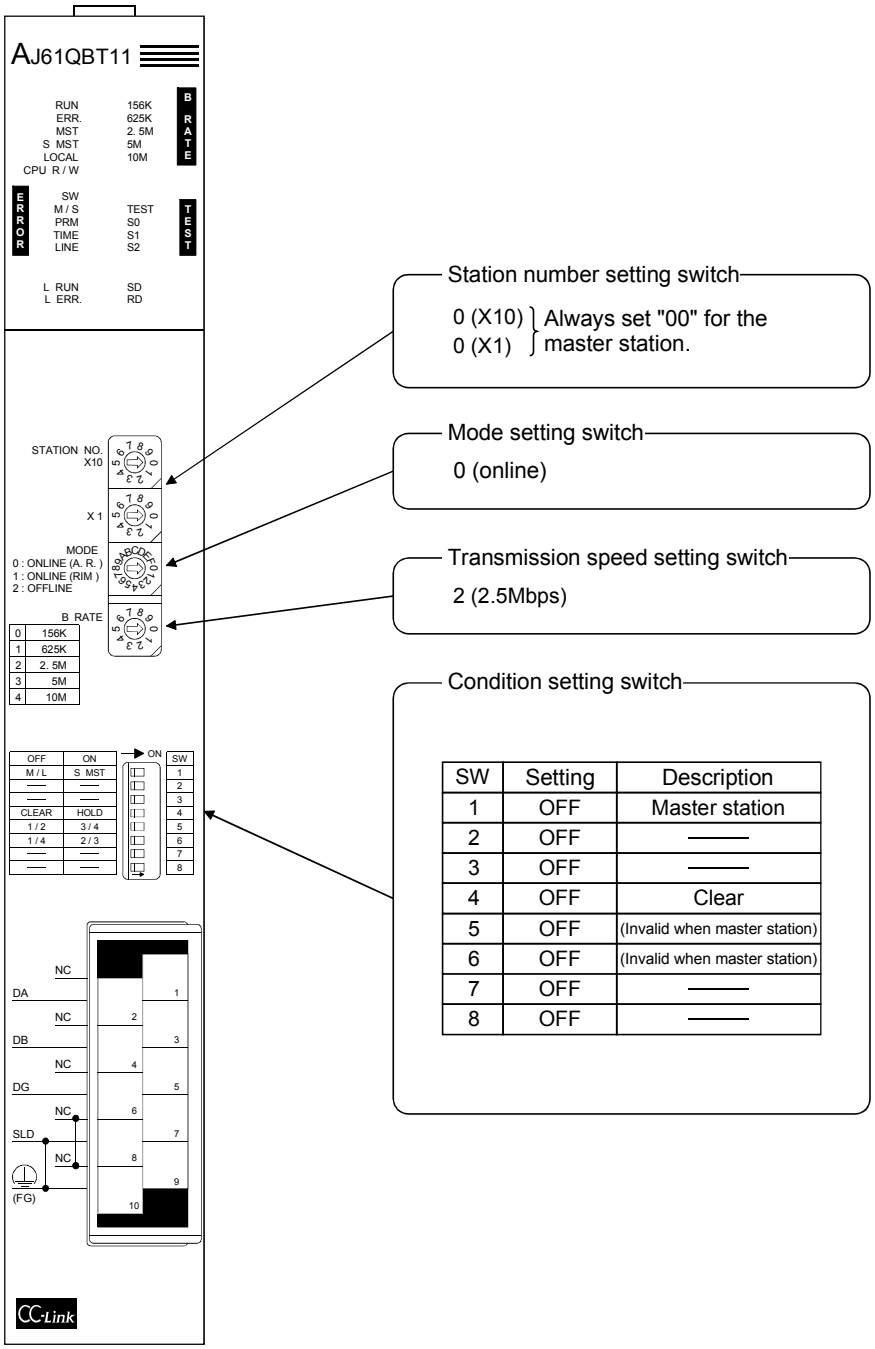
12.1 System Configuration

A system with a remote I/O station, a remote device station and a local station is used as an example.



12.1.1 Setting of the master station

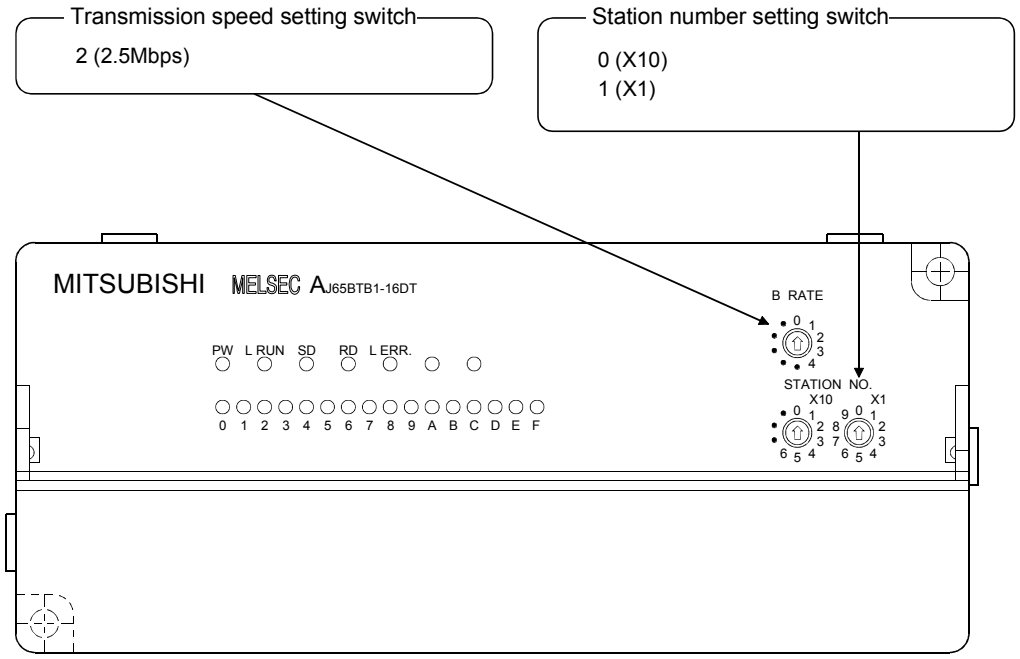
The settings of the switches on the master station are shown below:



SW	Setting	Description
1	OFF	Master station
2	OFF	———
3	OFF	———
4	OFF	Clear
5	OFF	(Invalid when master station)
6	OFF	(Invalid when master station)
7	OFF	———
8	OFF	———

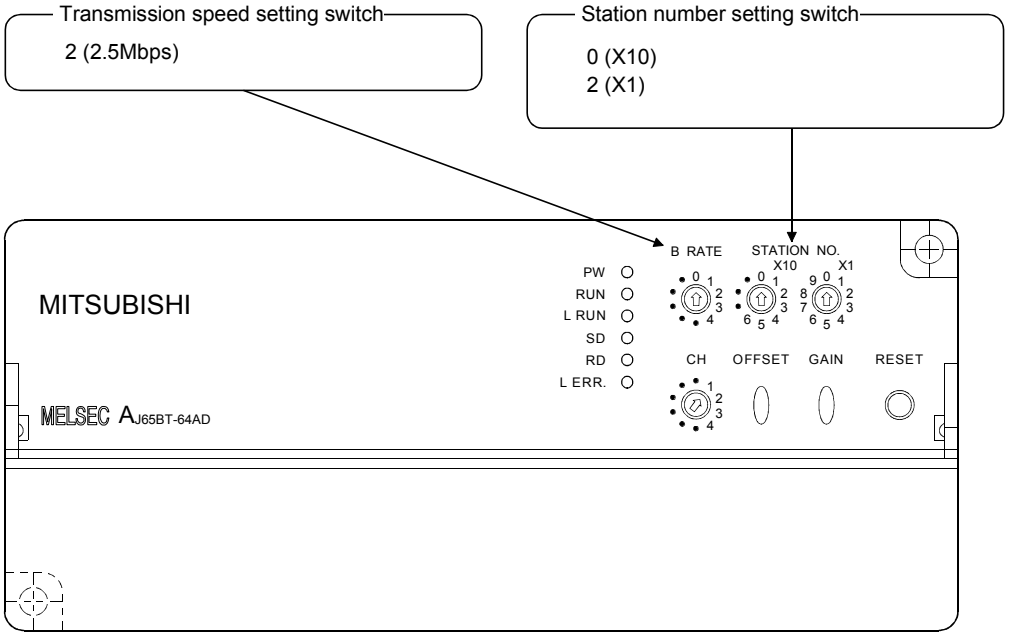
12.1.2 Setting of the remote I/O station

The settings of the switches on the remote I/O station are shown below:



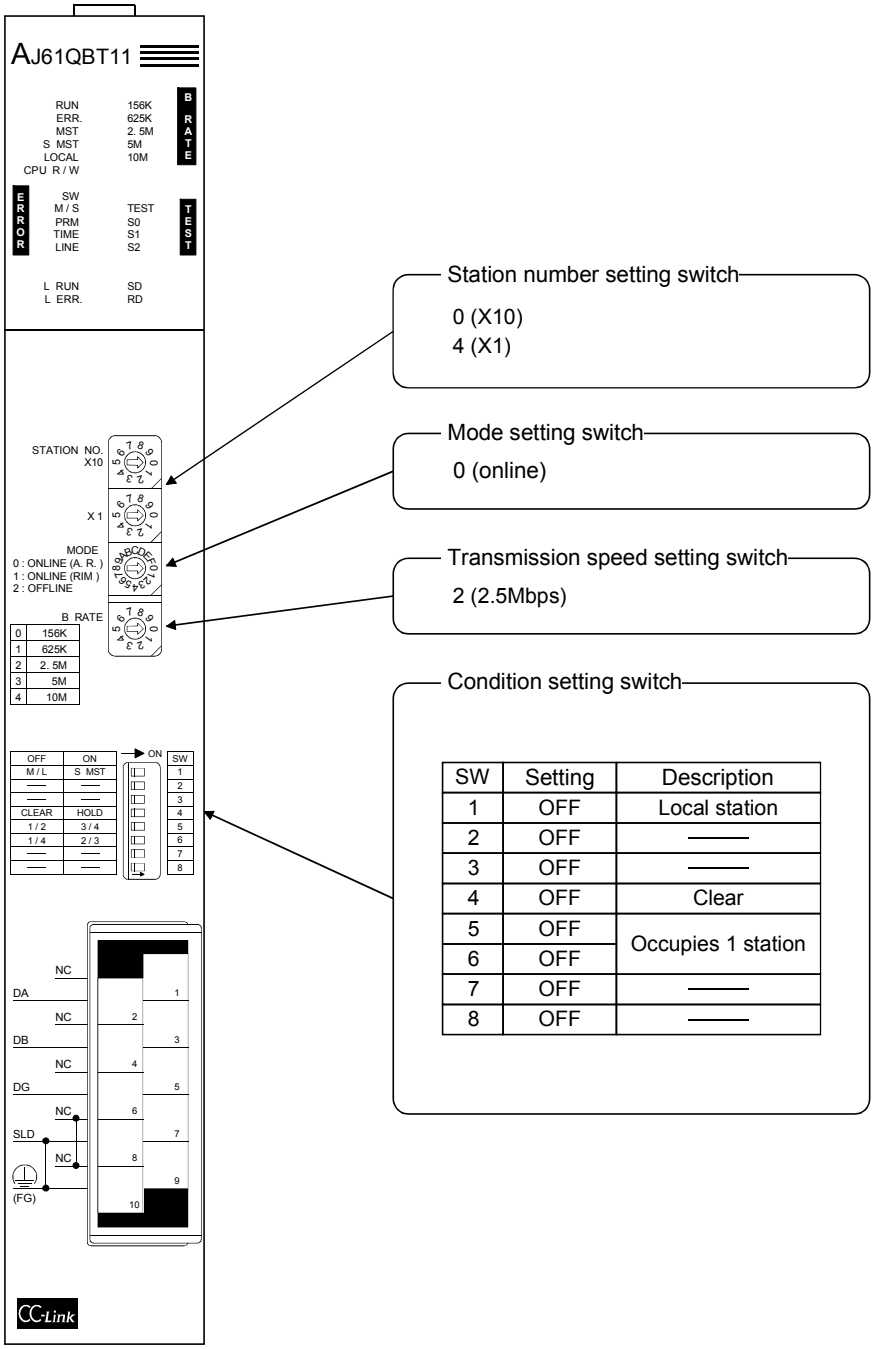
12.1.3 Setting of the remote device station

The settings of the switches on the remote device station are shown below:



12.1.4 Setting of the local station

The settings of the switches on the local station are shown below:



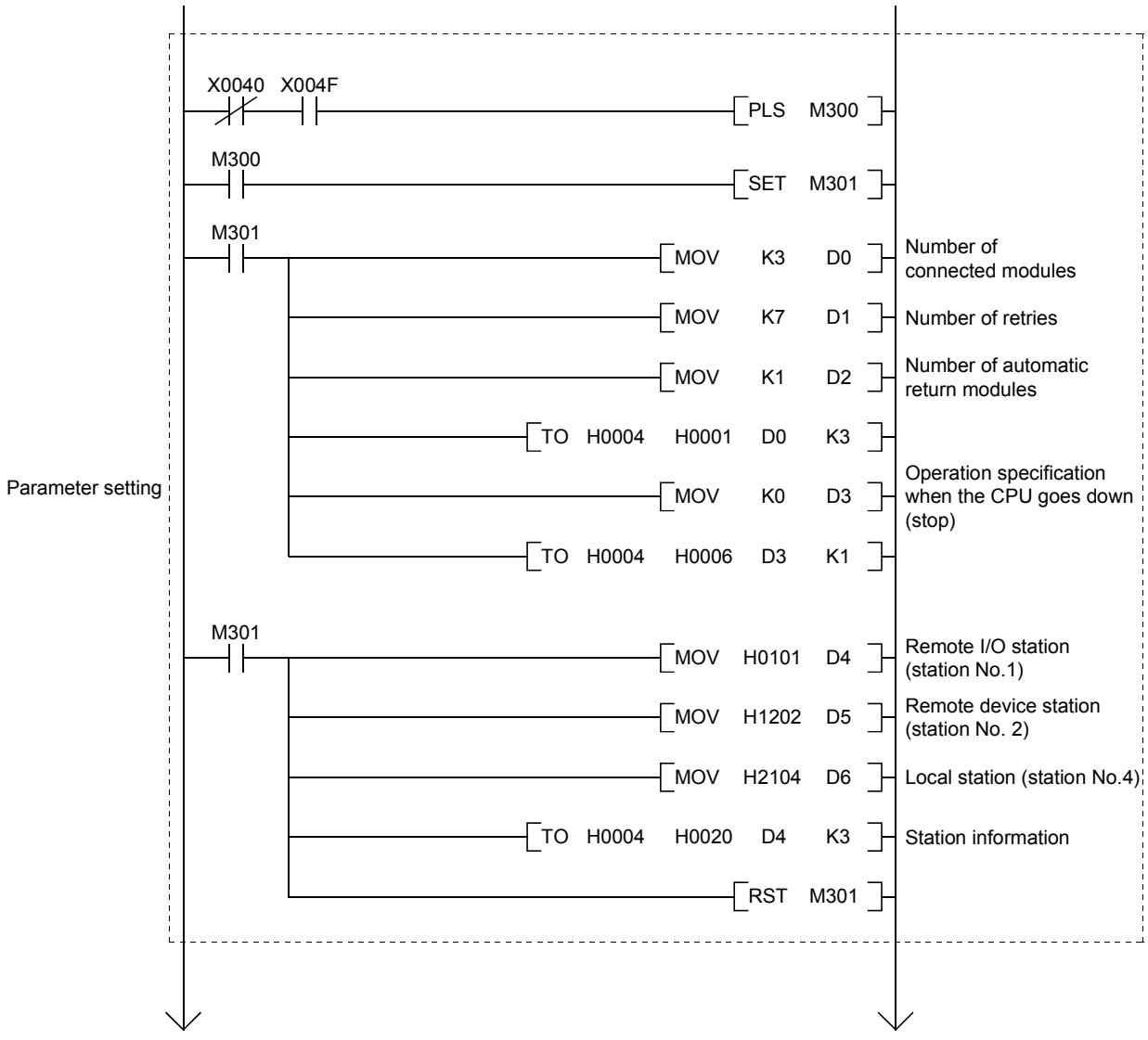
12.2 Creating a Program

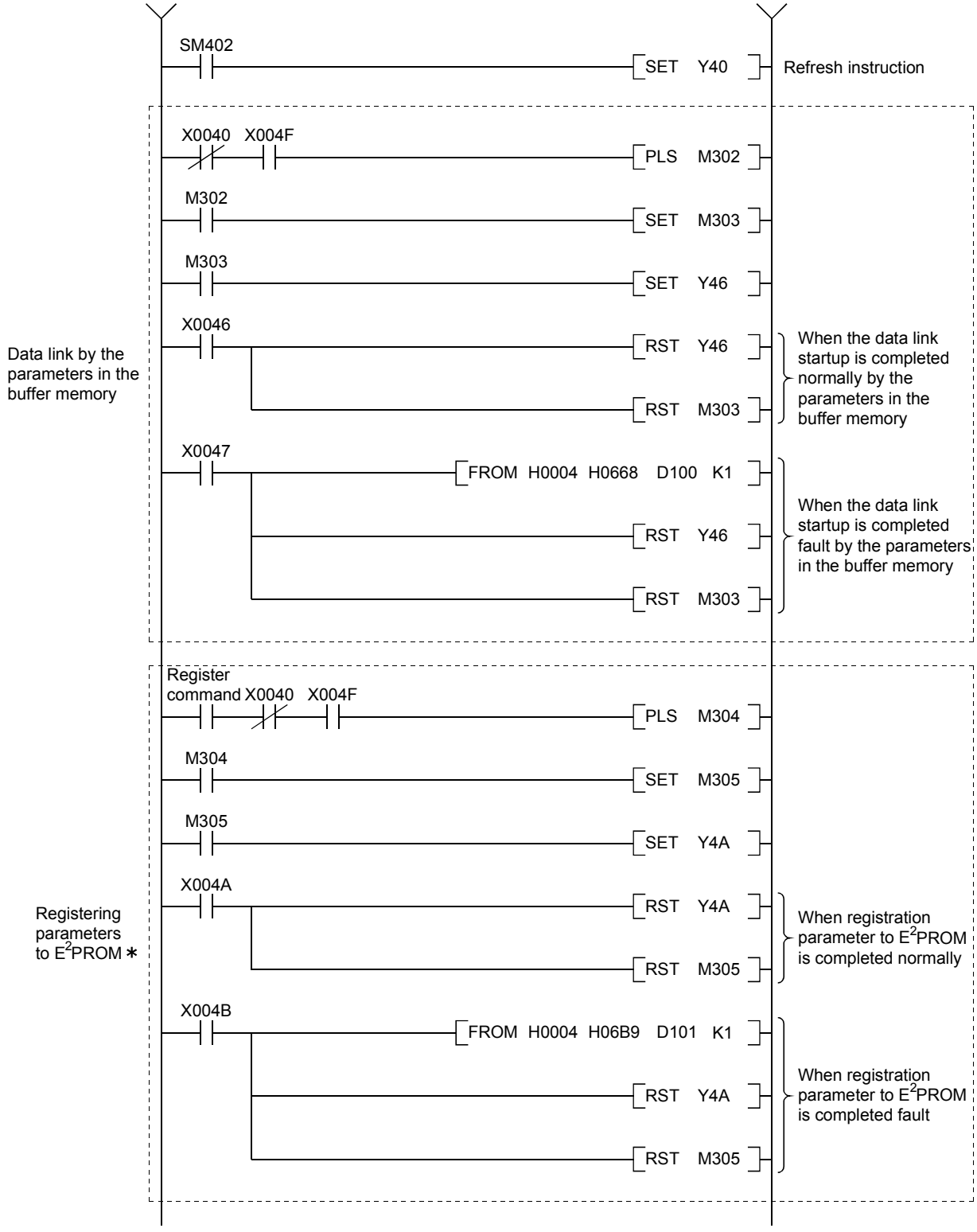
12.2.1 Program for the master station

(1) Parameter program

Program for the parameter this program automatically initiates the data link when the programmable controller CPU starts running.

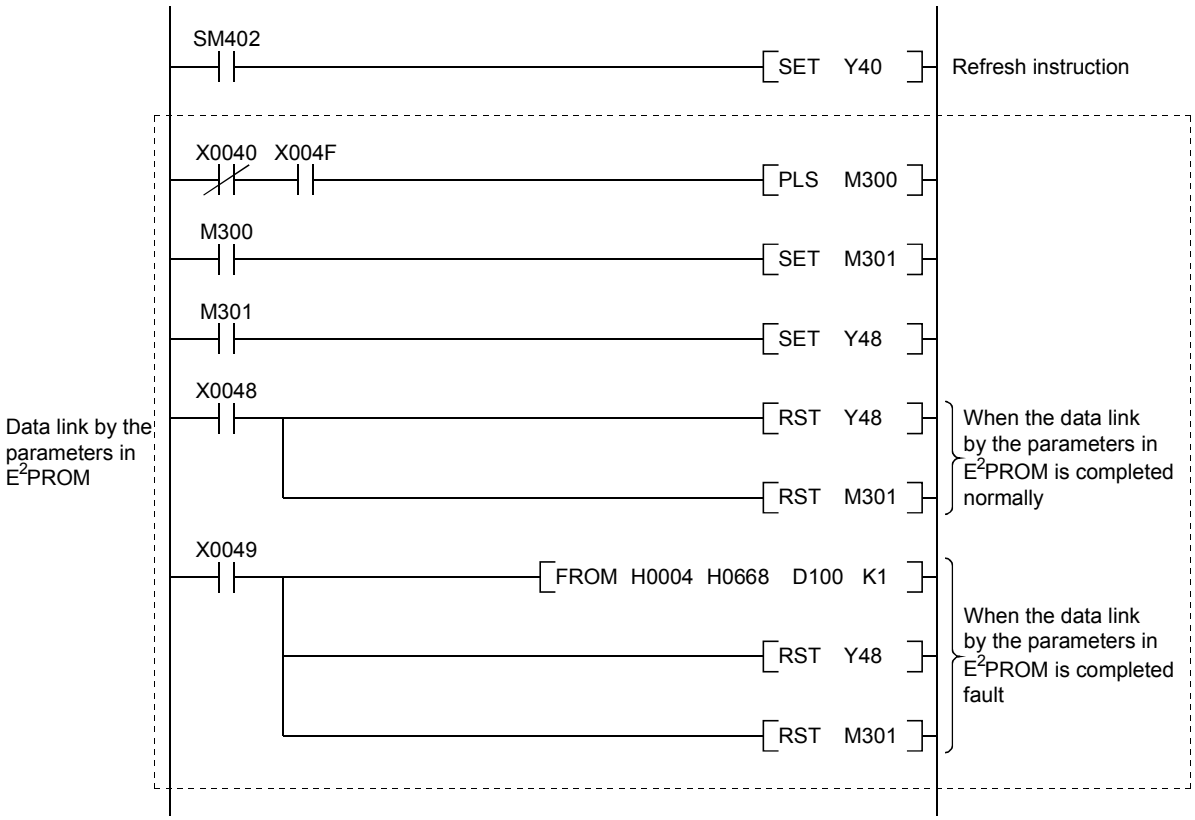
[When debugging]





∗: Refer to Section 8.2 when using the software version E (manufactured in Aug., 2001) or later of the A1SJ61QBT11.

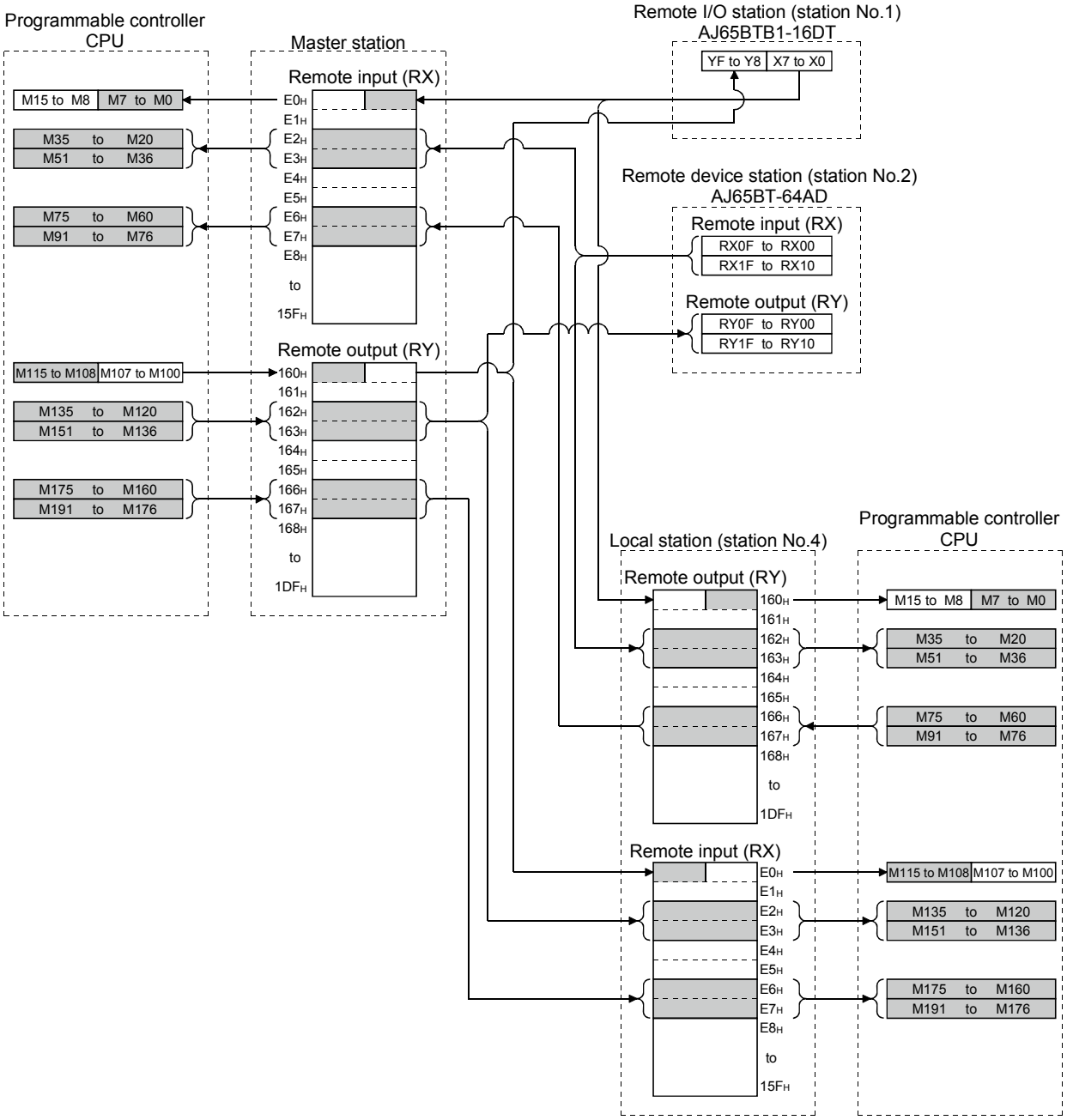
[During operation]



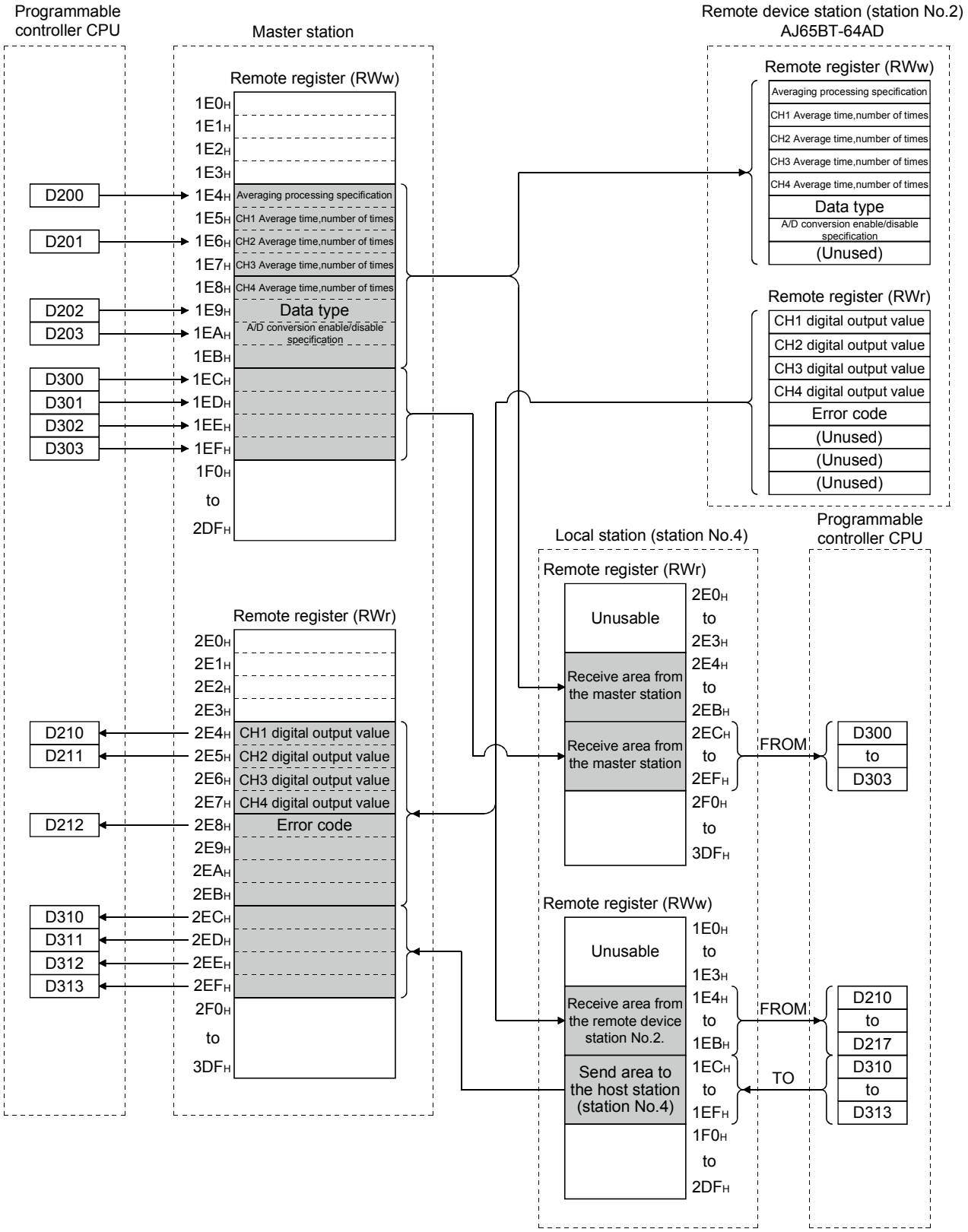
(2) Communication program

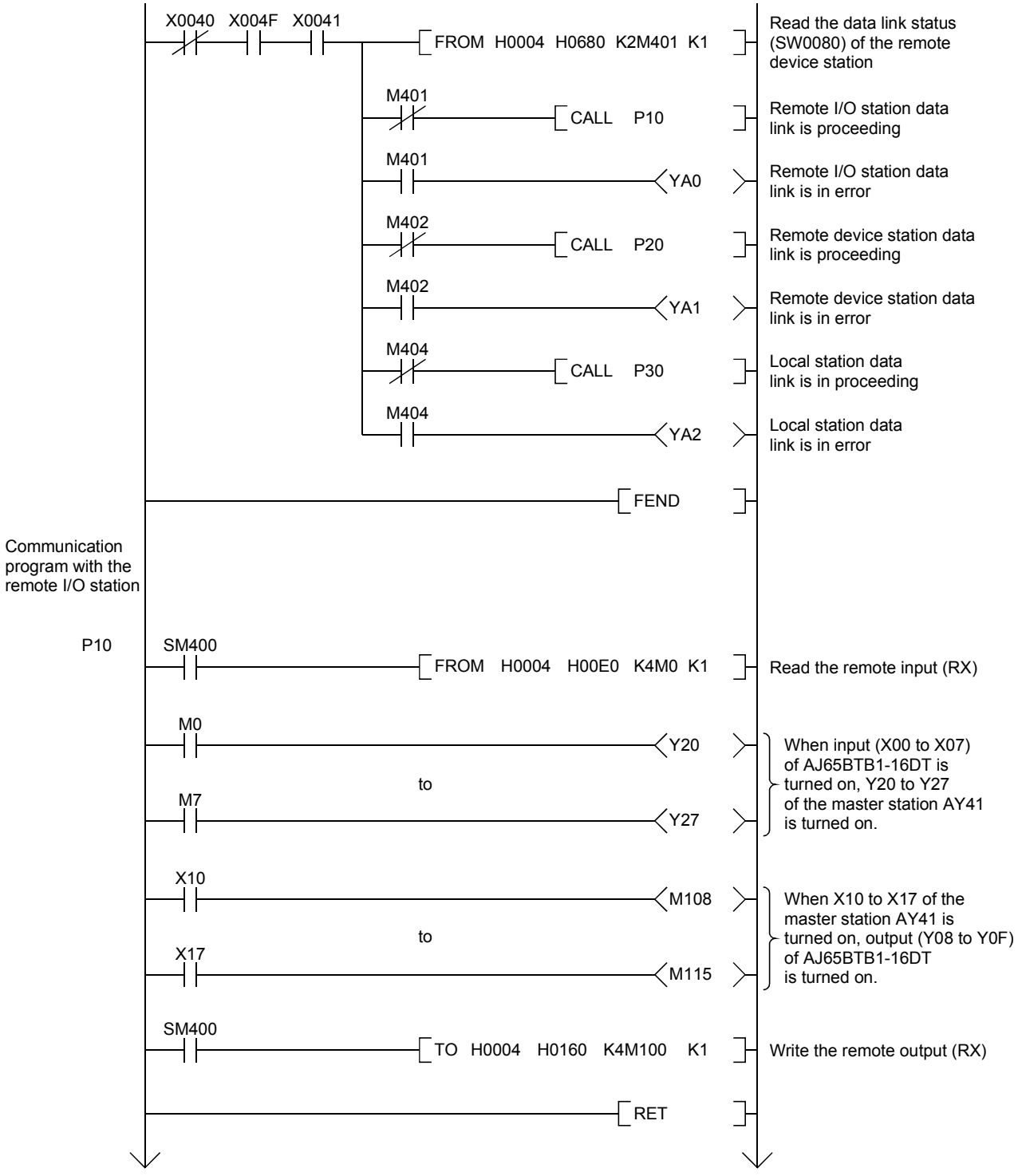
The following configuration of the programmable controller CPU device, master station's buffer memory and local station's buffer memory is assumed.

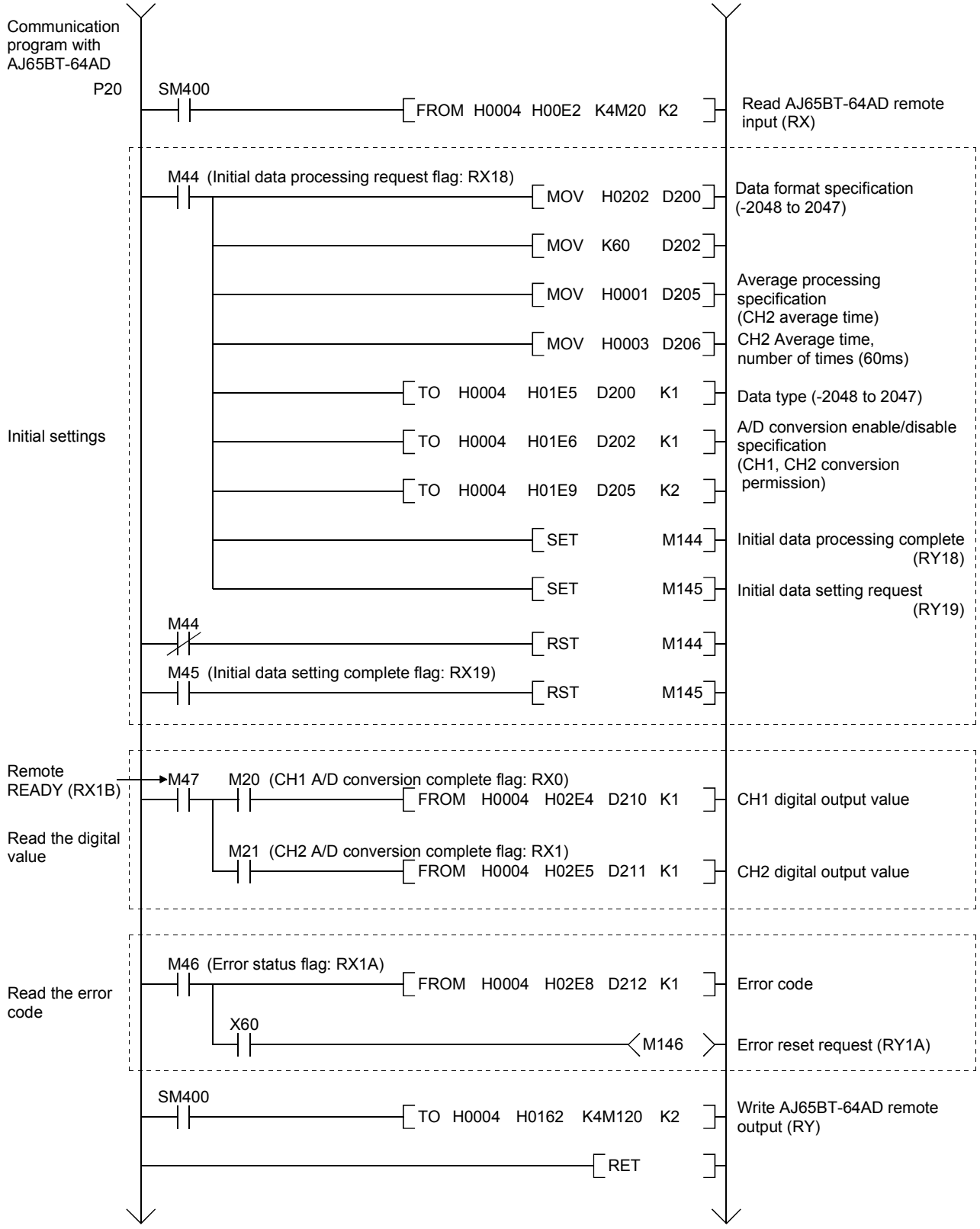
[Remote input (RX), remote output (RY)]

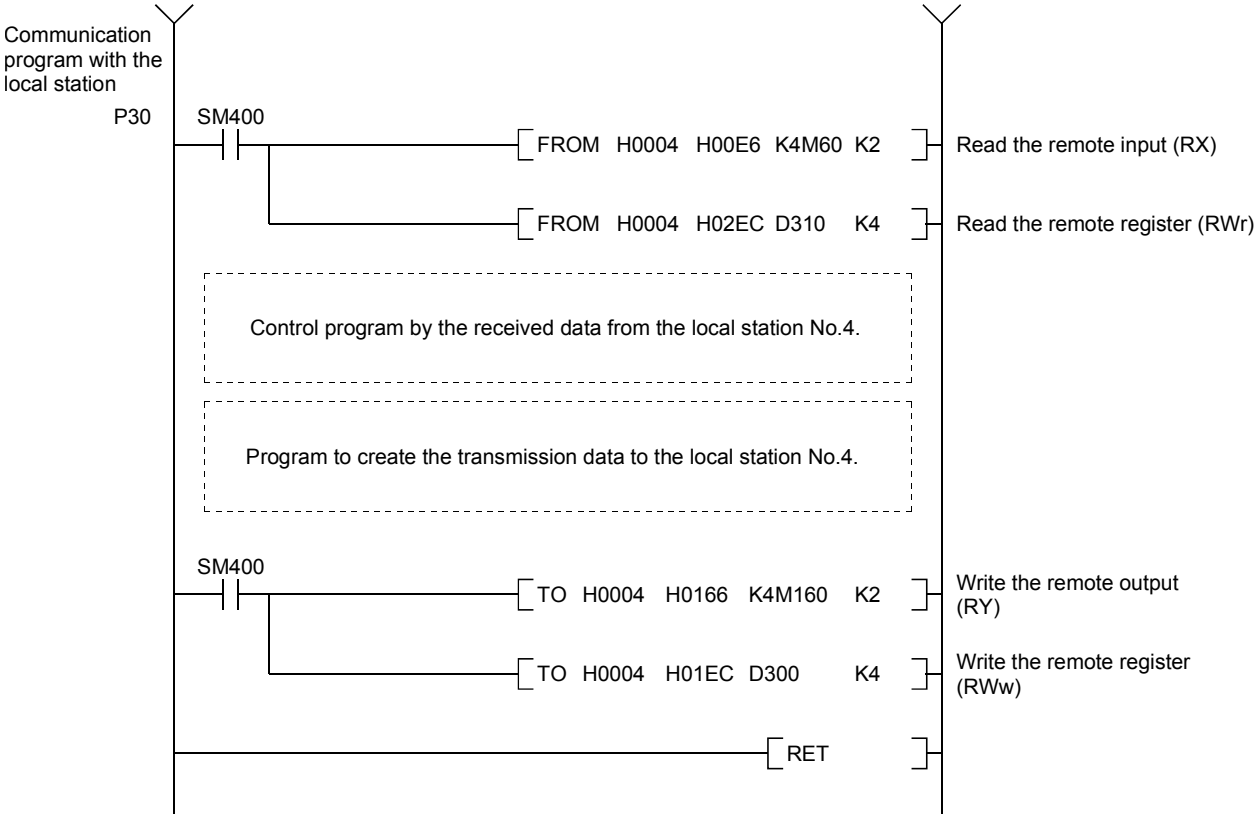


[Remote register (RWw, RWr)]




X0040 X004F X0041
FROM H0004 H0680 K2M401 K1
Read the data link status (SW0080) of the remote device station
M401
CALL P10
Remote I/O station data link is proceeding
M401
YA0
Remote I/O station data link is in error
M402
CALL P20
Remote device station data link is proceeding
M402
YA1
Remote device station data link is in error
M404
CALL P30
Local station data link is in proceeding
M404
YA2
Local station data link is in error
FEND
Communication program with the remote I/O station
P10
SM400
FROM H0004 H00E0 K4M0 K1
Read the remote input (RX)
M0
Y20
to
M7
Y27
When input (X00 to X07) of AJ65BTB1-16DT is turned on, Y20 to Y27 of the master station AY41 is turned on.
X10
M108
to
X17
M115
When X10 to X17 of the master station AY41 is turned on, output (Y08 to Y0F) of AJ65BTB1-16DT is turned on.
SM400
TO H0004 H0160 K4M100 K1
Write the remote output (RX)
RET


Communication program with AJ65BT-64AD
P20
SM400
FROM H0004 H00E2 K4M20 K2
Read AJ65BT-64AD remote input (RX)
Initial settings
M44 (Initial data processing request flag: RX18)
MOV H0202 D200
Data format specification (-2048 to 2047)
MOV K60 D202
MOV H0001 D205
Average processing specification (CH2 average time)
MOV H0003 D206
CH2 Average time, number of times (60ms)
TO H0004 H01E5 D200 K1
Data type (-2048 to 2047)
TO H0004 H01E6 D202 K1
A/D conversion enable/disable specification (CH1, CH2 conversion permission)
TO H0004 H01E9 D205 K2
SET M144
Initial data processing complete (RY18)
SET M145
Initial data setting request (RY19)
M44
RST M144
M45 (Initial data setting complete flag: RX19)
RST M145
Remote READY (RX1B)
Read the digital value
M47
M20 (CH1 A/D conversion complete flag: RX0)
FROM H0004 H02E4 D210 K1
CH1 digital output value
M21 (CH2 A/D conversion complete flag: RX1)
FROM H0004 H02E5 D211 K1
CH2 digital output value
Read the error code
M46 (Error status flag: RX1A)
FROM H0004 H02E8 D212 K1
Error code
X60
M146
Error reset request (RY1A)
SM400
TO H0004 H0162 K4M120 K2
Write AJ65BT-64AD remote output (RY)
RET


Communication program with the local station
P30
SM400
FROM H0004 H00E6 K4M60 K2
Read the remote input (RX)
FROM H0004 H02EC D310 K4
Read the remote register (RWr)
Control program by the received data from the local station No.4.
Program to create the transmission data to the local station No.4.
SM400
TO H0004 H0166 K4M160 K2
Write the remote output (RY)
TO H0004 H01EC D300 K4
Write the remote register (RWw)
RET

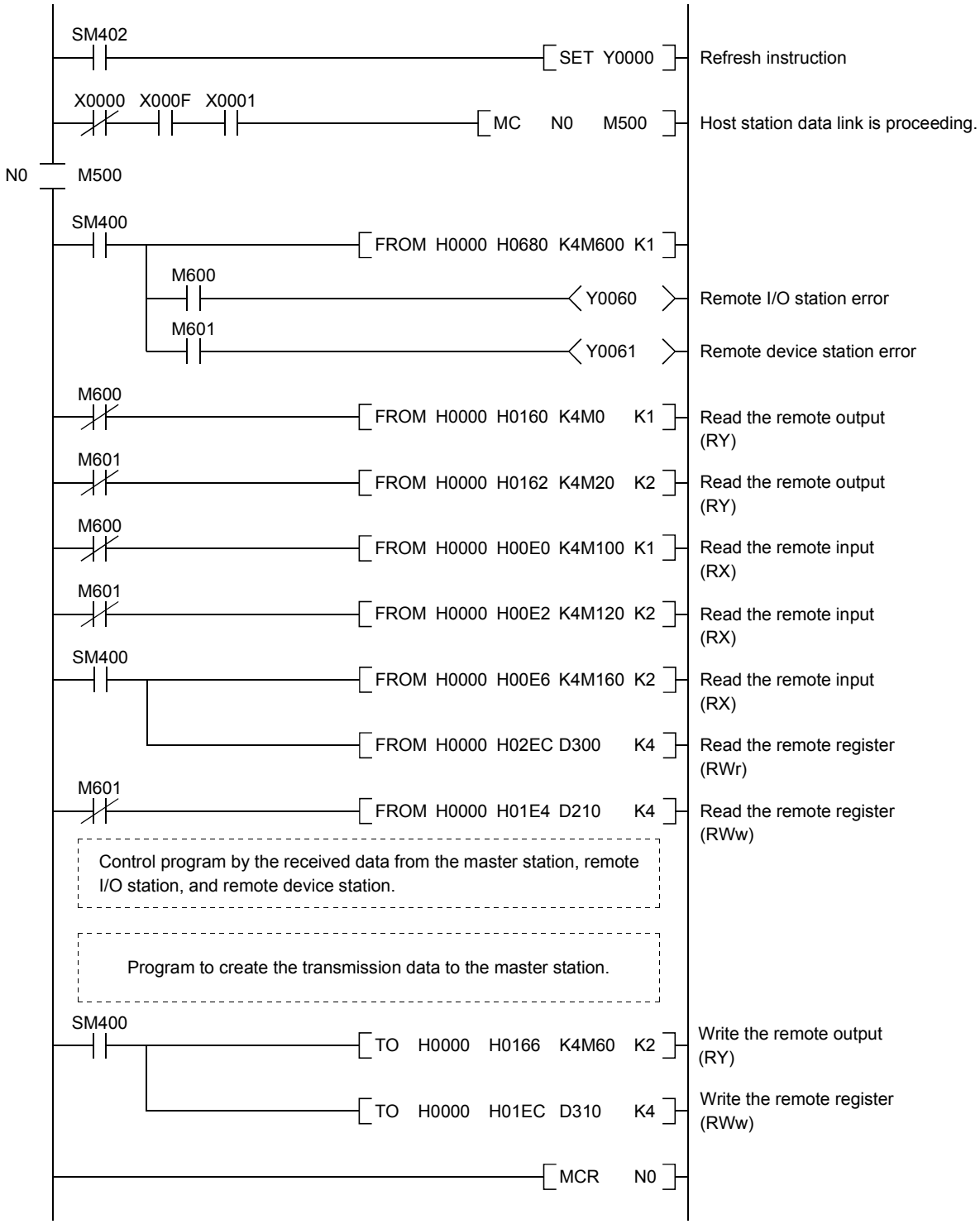
12.2.2 Local station program

(1) Program for parameters

Local stations do not need this.

(2) Program for communication

Refer to Section 12.2.1 (2), for the relationship between the programmable controller CPU device, master station's buffer memory, and the local station's buffer memory.



12.3 Performing the Data Link

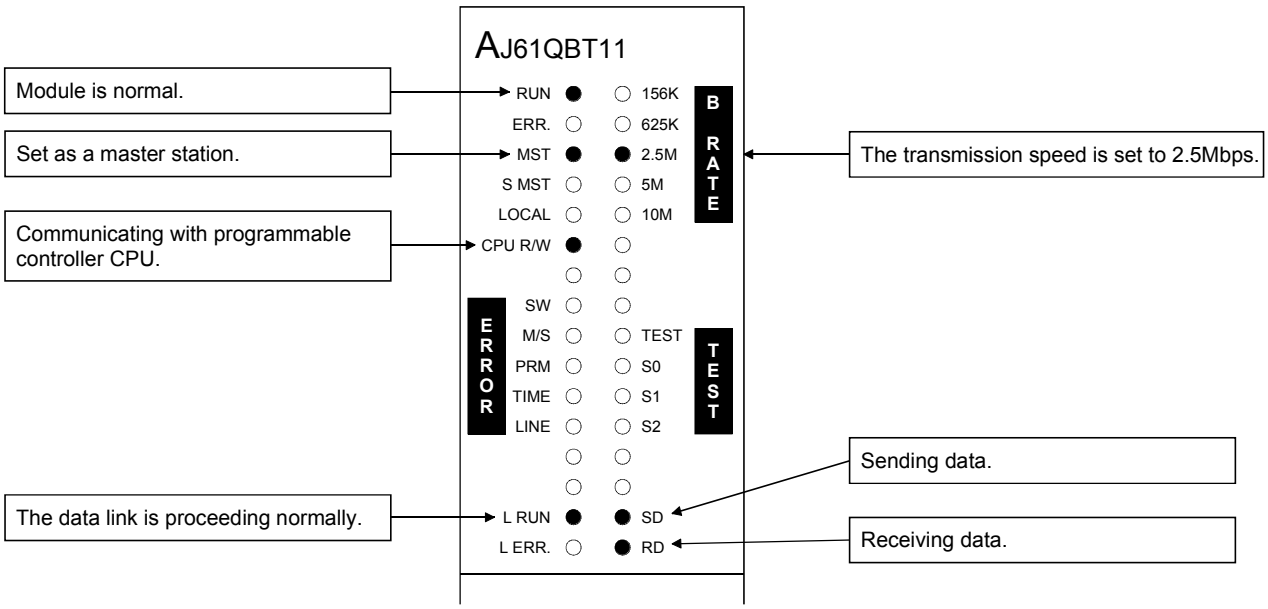
Turn on the power supply of the remote I/O station/remote device station/local station first, then the power supply of the master station to start the data link.

12.3.1 Confirming the operation by LED display

The following diagram shows the LED display status of the master station, the remote I/O station, the remote device station, and the local station when the data link is performed normally.

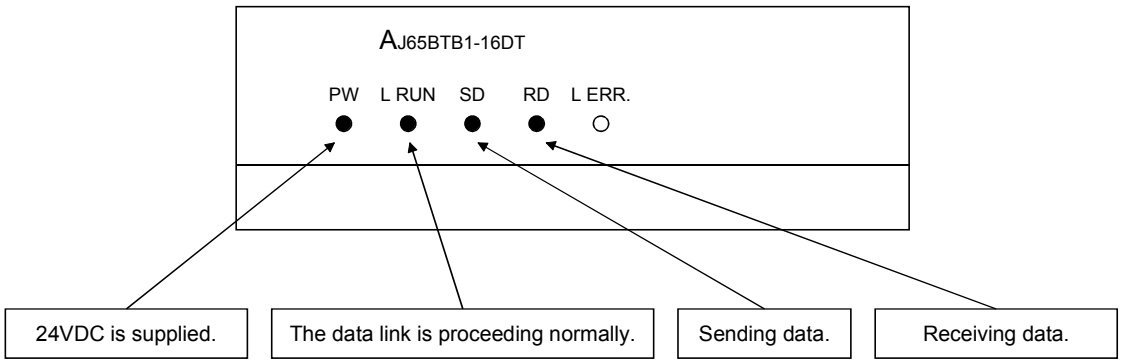
(1) LED display of the master station

Confirm that the LED display shows the following status:



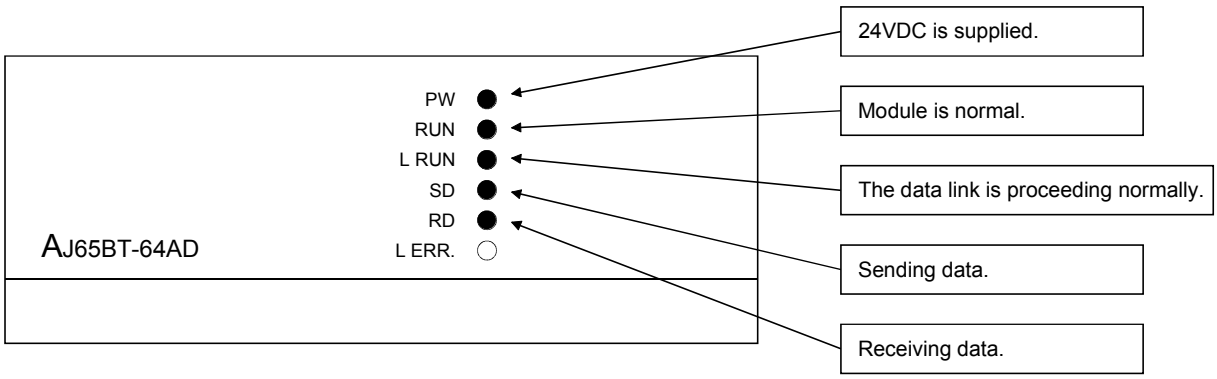
(2) LED display of the remote I/O station

Confirm that the LED display shows the following status:



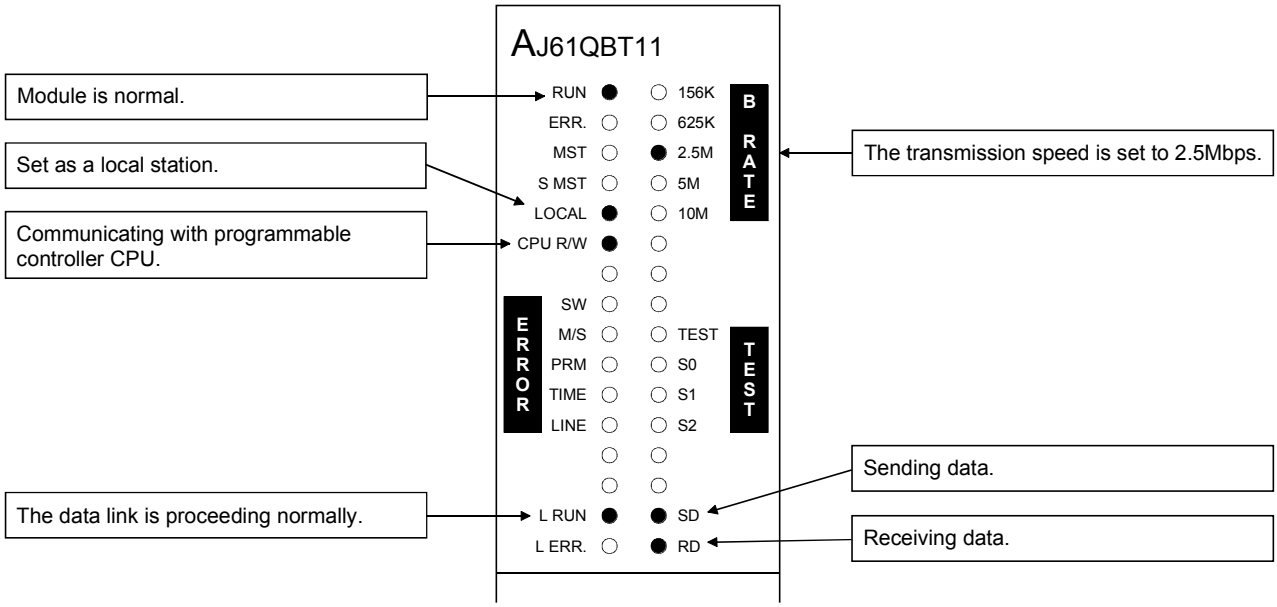
(3) LED display of the remote device station

Confirm that the LED display shows the following status:



(4) LED display of the local station

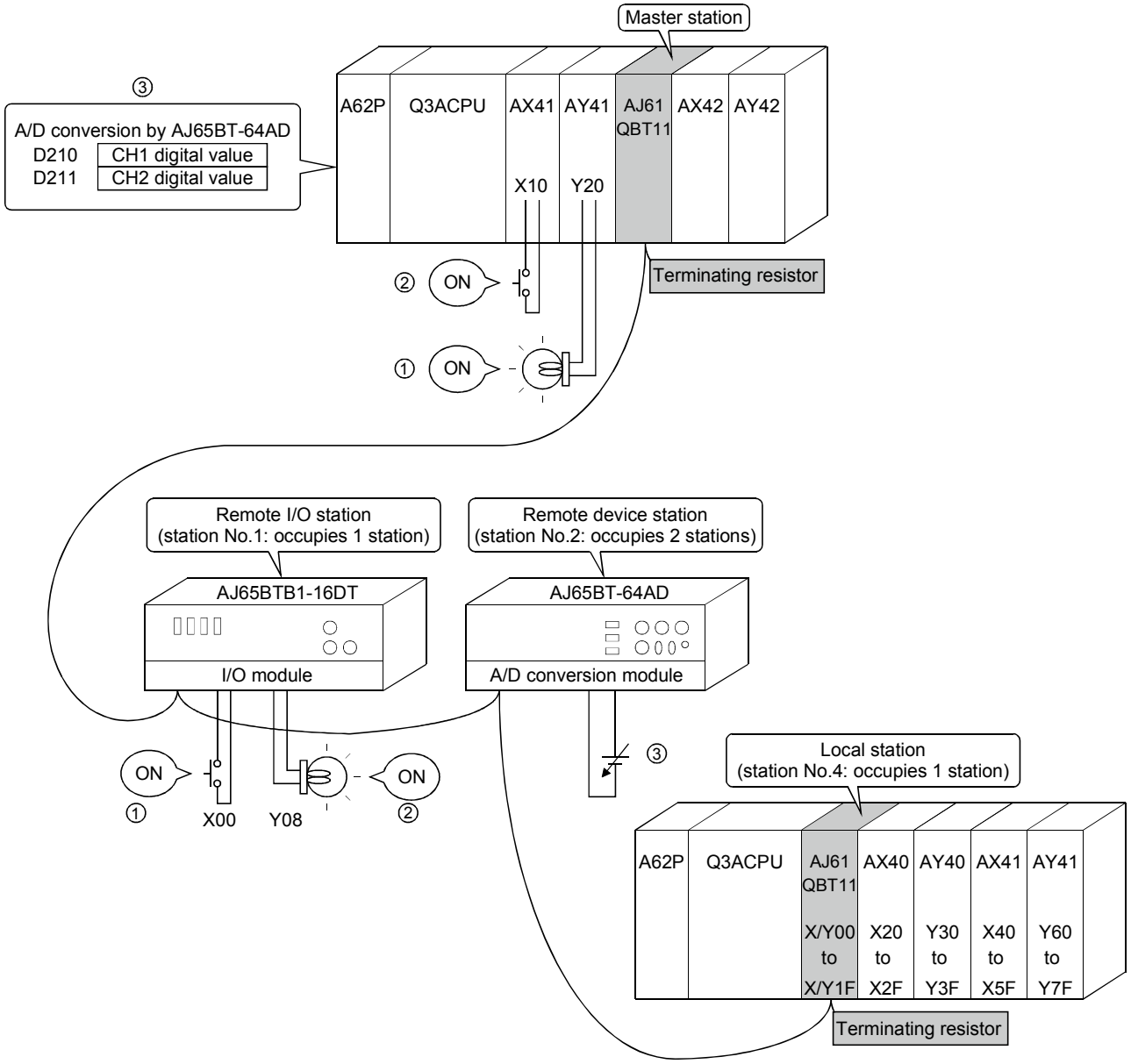
Confirm that the LED display shows the following status:



12.3.2 Confirming the operation by the program

Confirm if the data link can be performed normally using a sequence program.

① When X00 of the remote I/O station is turned on, Y20 of the master station is turned on.
② When X10 of the master station is turned on, Y08 of the remote I/O station is turned on.
③ The digital value which was converted by the remote device station is stored in D210 (CH1) and D211 (CH2) of the master station and the local station.
④ When M160 of the master station is turned on, M160 of the local station is turned on.
⑤ When the data is written into D100 of the master station, it is stored in D100 of the local station.
⑥ When M60 of the local station is turned on, M60 of the master station is turned on.
⑦ When the data is written into D310 of the local station, it is stored in D310 of the master station.



13. TROUBLESHOOTING

13.1 Verification When a Trouble Occurs

Details to be checked and corrective actions for each trouble are shown below:

Trouble description	Details to be checked	Confirmation action
Unable to perform data link for the entire system.	Are there any disconnected cables?	• Check the cable status visually or with a line test. • Verify the line status (SW0090).
	Are terminating resistors connected properly to both end stations?	Connect terminating resistors attached to AJ61QBT11 and A1SJ61QBT11 to both end stations.
	Has an error occurred at the master station's programmable controller CPU?	Verify the error code of programmable controller CPU and perform the corrective action.
	Are parameters set for the master station?	Verify the parameter details.
	Is a request for data link startup (Yn6 or Yn8) turned on?	Verify the sequence program.
	Did an error occur at the master station?	Verify the following: • The parameter status at the host station (SW0068) • The switch setting status (SW006A) • Loading status (SW0069) • Is the master station "ERR" flashing? (Refer to Section 13.2.)
	Is the scan time exceeding the maximum value in the synchronous mode?	Switch to the asynchronous mode or slow down the transmission speed.
Unable to get input from a remote I/O station.	Is the remote I/O station performing data link?	Verify using the following means: • LED display at the module • Other station data link status (SW0080 to SW0083) of the master station
	Is data read from the correct address of remote input RX (buffer memory)?	Verify the sequence program.
	Is the station incorrectly set as reserved?	Verify parameters.
	Did the station number overlap?	Verify the station number.
Cannot output data from a remote I/O station.	Is the remote I/O station performing data link?	Verify using the following means: • LED display of the module • Other station data link status (SW0080 to SW0083) of the master station
	Is the refresh instruction (Yn0) at the master station turned on?	Verify the sequence program.
	Is data written to the correct address of remote output RY (buffer memory)?	Verify the sequence program.
	Is the station incorrectly set as reserved?	Verify parameters.
	Did the station number overlap?	Verify the station number.
Unable to get remote input (RX) from a remote device station.	Is the remote device station performing data link?	Verify using the following means: • LED display of the module • Other station data link status (SW0080 to SW0083) of the master station
	Is data read from the correct address of remote input RX (buffer memory)?	Verify the sequence program.
	Is the station incorrectly set as reserved?	Verify parameters.
	Did the station number overlap?	Verify the station number.

After checking Other station data link status (SW0080 to SW0083), perform the following.

① Check if the wiring is correct.

② Check if the terminating resistors are connected correctly to the modules on both ends.

③ Confirm if the communication is successful after slowing down the transmission speed.

④ Confirm if the settings of the parameter and the startup station match each other.

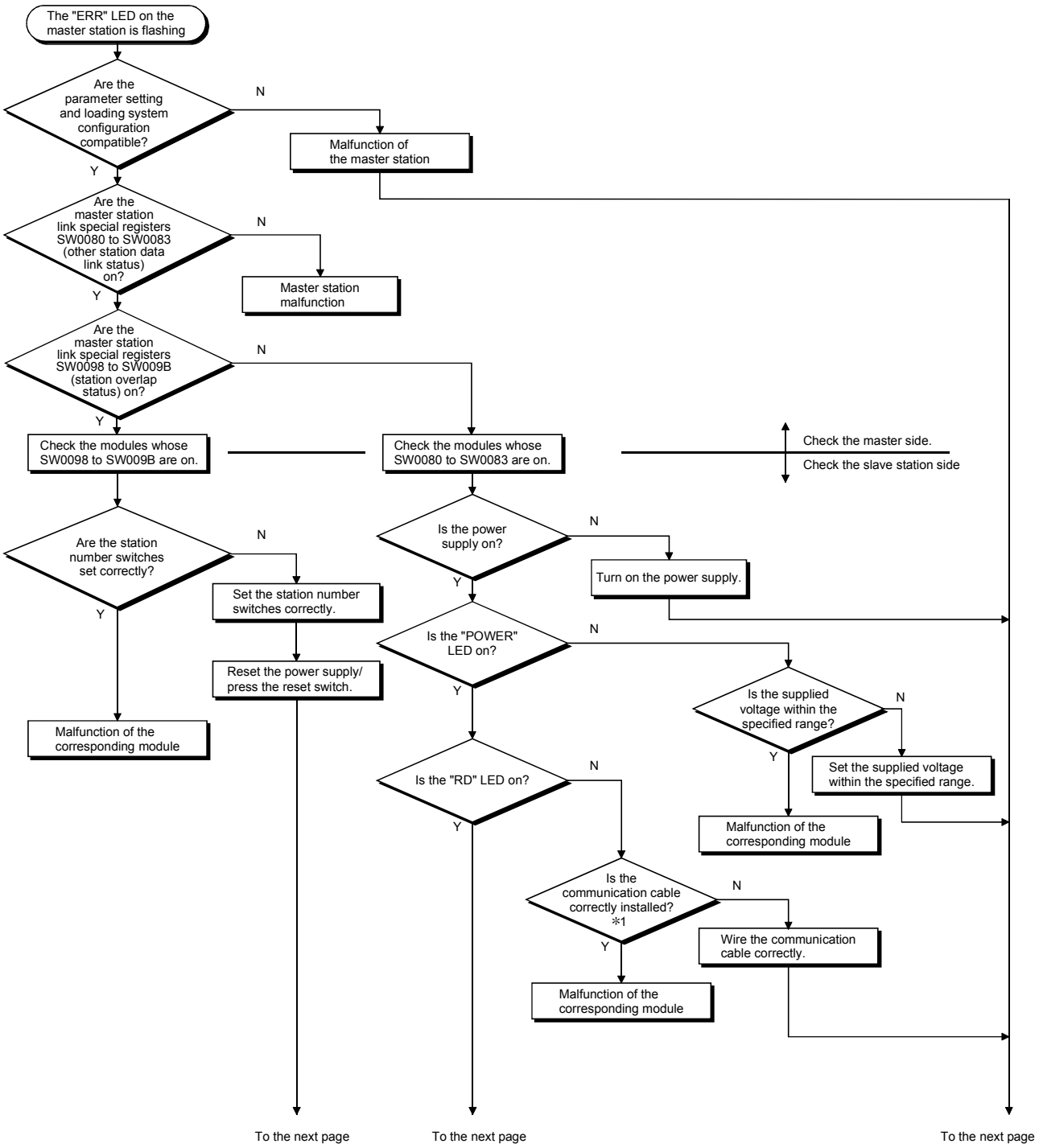
⑤ Confirm if the station numbers do not overlap.

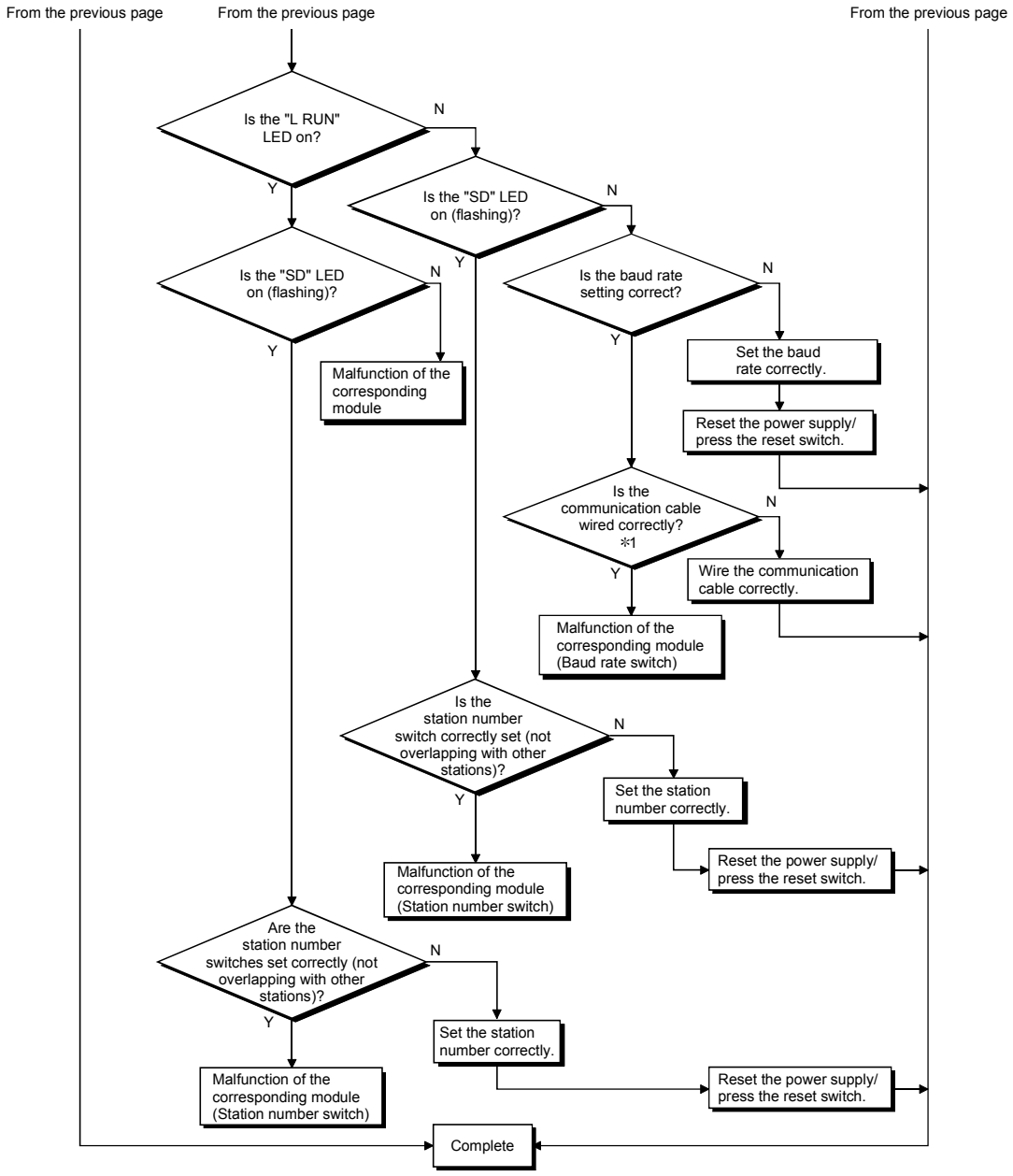
⑥ Replace with a correctly operating module, and check to see if it is a module malfunction.

Trouble description	Details to be checked	Confirmation action
Cannot turn on/off remote output (RY) from a remote device station.	Is the remote device station performing data link?	Verify using the following means: • LED display of the module • Other station data link status (SW0080 to SW0083) of the master station
	Is the refresh instruction (Yn0) turned on at the master station?	Verify the sequence program.
	Is data written to the correct address of remote output RY (buffer memory)?	Verify the sequence program.
	Is the station incorrectly set as reserved?	Verify parameters.
	Did the station number overlap?	Verify the station number.
Unable to get the remote register (RWr) data from a remote device station.	Is the remote device station performing data link?	Verify using the following means: • LED display of the module • Other station data link status (SW0080 to SW0083) of the master station
	Is data read from the correct address of the remote register RWr (buffer memory)?	Verify the sequence program.
	Is the station incorrectly set as reserved?	Verify the parameters.
	Did the station number overlap?	Verify the station number.
Unable to write data onto the remote register (RWw) at a remote device station.	Is the remote device station performing data link?	Verify using the following means: • LED display of the module • Other station data link status (SW0080 to SW0083) of the master station
	Is data written to the correct address of remote register RWw (buffer memory)?	Verify the sequence program.
	Is the station incorrectly set as reserved?	Verify the parameters.
	Did the station number overlap?	Verify the station number.
Unable to communicate from the master station (remote output RY) to the local station (remote input RX).	Is the corresponding local station performing data link?	• Check the LED indication of the corresponding local station. • Check Other station data link status (SW0080 to SW0083) of the master station.
	Is the refresh instruction (Yn0) at the master station turned on?	Verify the sequence program.
	Is data written to the correct address of the remote output RY (buffer memory) at the master station?	Verify the sequence program.
	Is data read from the correct address of the remote input RX (buffer memory) at the local station?	Verify the sequence program.
	Is the station incorrectly set as reserved?	Verify the parameters.
	Did the station number overlap?	Verify the station number.
Unable to communicate from the local station (remote output RY) to the master station (remote input RX).	Is the corresponding local station performing data link?	• Check the LED indication of the corresponding local station. • Check Other station data link status (SW0080 to SW0083) of the master station.
	Is the refresh instruction (Yn0) at the local station turned on?	Verify the sequence program.
	Is data written to the correct address of remote output RY (buffer memory) at the local station?	Verify the sequence program.
	Is data read from the correct address of the remote input RX (buffer memory) at the master station?	Verify the sequence program.
	Is the station incorrectly set as reserved?	Verify the parameters.
	Did the station number overlap?	Verify the station number.

Trouble description	Details to be checked	Confirmation action
Unable to communicate from the master station (remote register RWw) to the local station (remote register RWr).	Is the corresponding local station performing data link?	• Check the LED indication of the corresponding local station. • Check Other station data link status (SW0080 to SW0083) of the master station.
	Does the occupied station count setting of the local station match the station information of the master station?	
	Is data written to the correct address of remote register RWw (buffer memory) at the master station?	Verify the sequence program.
	Is data read from the correct address of the remote register RWr (buffer memory) at the local station?	Verify the sequence program.
	Is the station incorrectly set as reserved?	Verify the parameters.
	Did the station number overlap?	Verify the station number.
Unable to communicate from the local station (remote register RWw) to the master station (remote register RWr).	Is the corresponding local station performing data link?	• Check the LED indication of the corresponding local station. • Check Other station data link status (SW0080 to SW0083) of the master station.
	Is data written to the correct address of remote register RWw (buffer memory) at the local station?	Verify the sequence program.
	Is data read from the correct address of the remote register RWr (buffer memory) at the master station?	Verify the sequence program.
	Is the station incorrectly set as reserved?	Verify the parameters.
	Did the station number overlap?	Verify the station number.
Unable to stop data link.	Is the data link stop (SB0002) turned on?	Verify the sequence program.
	Did an error occur?	Verify the data link stop result (SW0045).
Unable to restart data link.	Is the data link stop (SB0000) turned on?	Verify the sequence program.
	Did an error occur?	Verify the data link restart result (SW0041).
Parameter cannot be registered in E^2PROM.	Is the parameter registration request (YnA) to the E^2PROM on?	Verify the sequence program.
	Any errors occurred?	Verify the E^2PROM registration status (SW00B9).
Remote/local station does not start up.	Are the station information in the parameters and the settings as the module which does not start up consistent?	Verify the parameters.
	Overlapping with other module's station number?	Verify the station number setting switch.
Faulty stations cannot be detected.	Set as an error-invalid station?	Verify the parameters.
	Did the station number overlap?	Verify the station number.
Faulty stations arise due to transmission speed.	Can a faulty station be identified using Other station data link status (SW0080 to SW0083)?	• Verify the faulty station switch setting. • Verify if the wiring is correct. • Verify if the cable shield has been grounded.
	Can communicate normally when changed to slower transmission speed like 156 kbps?	
The abnormal completion bit turns on when executing a dedicated	Did an error occur?	• Verify the CPU's error code. • Verify the master station's error code.
	Is an automatic refresh parameter set?	Set the automatic refresh parameter using the software package.

13.2 Troubleshooting When the "ERR" LED on the Master Station Is Flashing





*1 Check for a short, reversed connection, wire breakage, terminating resistor, FG connection, overall distance and station-to-station distance.

13.3 Error Codes

Table 13.1 lists the error codes that are stored in the link special registers (SW). When a standby master station is used, refer to the respective columns under "Delectability" in the table as explained below.

- When a standby master station is operating as a master station: "Master station" column
- When a standby master station is operating as a standby master station: "Local station" column

Table 13.1 Error code list (1/6)

Error code (hexadecimal)	Error details	Cause of error occurrence (details)	Corrective action	Detectability	
				Master station	Local station
4000 to 4FFF	An error detected in a programmable controller CPU Take a corrective action, referring to the troubleshooting description in the user's manual for the CPU module used.				
7000 to 7FFF	An error detected in a serial communication module Take a corrective action, referring to the troubleshooting description in the Serial Communication Module User's Manual or other relevant manuals.				
B104	Data link restart error	Data link restart (SB0000) was executed for the station that was performing a data link.	Execute Data link restart (SB0000) for the station that has stopped a data link with Data link stop (SB0002).	○	○
B105	Data link stop error	Data link stop (SB0002) was executed for the station that had stopped a data link.	Execute Data link stop (SB0002) for the station that is performing a data link.	○	○
B110 ＊1	Transient data can not be received	A line error has occurred.	Check the line.	○	○
B111 ＊1	Transient data receiving order error	A line error has occurred.	Check the line.	○	○
B112 ＊1	Transient data length error	A line error has occurred.	Check the line.	○	○
B113 ＊1	Transient data ID error	A line error has occurred or an instantaneous power failure has occurred at the send station.	Check the line, or check the supply power and power supply module of the send station.	○	○
B115 ＊1	Link error	A line error has occurred.	Check the line.	○	○
B116 ＊1	Packet error	A line error has occurred.	Check the line.	○	○
B201 ＊1	Corresponding station error during sending	A data link error occurred at the corresponding station during transient transmission.	Check the data link status of other stations, if a temporary error invalid station is set, or if the corresponding station is stopped.	○	○
B205	Transient target station error	A transient request was issued to other than the intelligent device station.	Check the target station.	○	○
B301	Processing request error during link stop	Line test request was issued while the link was stopped.	Perform a line test while the link is being established.	○	○
B302	Specified station number setting error	The specified station number exceeded the highest communication station number during temporary error invalid request/temporary error invalid cancel request.	Specify a station number that is no greater than the highest communication station number.	○	×
B303	Specified station number not set error	The station number was not specified during temporary error invalid request/temporary error invalid cancel request.	Set a specified station number. (SW0003, SW0004 to SW0007)	○	×
B304	Line test error station detected	An error was detected in a remote station, intelligent device station or standby master station when a line test was performed.	Check that the remote station, intelligent device station or standby master station is operational and that the cable is not disconnected.	○	×
B306	Specified station number setting error	A station number other than the head station number was specified during temporary error invalid request/temporary error invalid cancel request.	Specify a head station when temporary error invalid request/temporary error invalid cancel request is requested.	○	×
B307	All stations data link error	All stations were in data link error status when one of the following requests was made: • SB0000 (data link restart) • SB0002 (data link stop)	Request again after the data link becomes normal.	○	○
B308	Station number setting error (installation status)	The station number of the slave station is outside of the range between "1 and 64".	Set the station number of the slave station within the range between "1 and 64".	○	×
B309	Station number overlap error	The station number of the connected module was duplicated (including number of occupied stations). However, this excludes the duplicate head station number.	Check the module station number.	○	×

＊1: Error code added to the function version B or later.

Table 13.1 Error code list (2/6)

Error code (hexadecimal)	Error details	Cause of error occurrence (details)	Corrective action	Detectability	
				Master station	Local station
B30A	Loading/parameter compatibility error	The station types of the module are different from parameter settings. Example) Connected module: Remote device — Parameter setting: Remote I/O Connected module: Intelligent device — Parameter setting: Remote I/O / Remote device	Set the correct parameters.	○	×
B30B ＊1	Loading/parameter compatibility error	The contents of the installation status and network parameters do not match.	Set the contents of the installation status and network parameters to match.	○	×
B30C ＊1	Standby master station specification error	Master station switching was instructed to a station other than the standby master station.	Specify the station number that corresponds to the standby master station.	○	○
B30D ＊1	Initial status	Temporary error invalid station specification. Line test request, or data link stop/restart request, etc. was issued before starting the link.	Issue the requests after the data link is started.	○	○
B30E	Unsupported error	In the function started by SB/SW, an attempt was made to execute the function, which is supported by only the master station, at the local station.	Execute the corresponding function from the master station.	×	○
B381	Station number switch setting error	The station number switch was outside of the setting range.	Set the station number switch within the setting range.	○	○
B383	Transmission speed setting switch setting error	The transmission speed setting switch is set outside the range.	Set the transmission speed setting switch to within the setting range.	○	○
B384	Station number setting error (parameter)	The station number (including the number of occupied stations) of the station information parameters (address 20H to 5FH) was set to "other than 1H to 40H."	Set within the range of "1H to 40H".	○	×
B385	Total number of stations error (parameter)	The total number of occupied stations set with the station information parameter (address 20H to 5FH) exceeded 64.	Set a parameter value of 64 or less.	○	×
B386	Number of occupied stations setting error (parameter)	The number of all occupied stations in the station information parameter (address 20H to 5FH) was set to "0".	Set the occupied station number to a value between "1 and 4".	○	×
B387	Delay time setting error (parameter)	The delay time setting in the master station network parameters is out of the setting range.	Set a value within the setting range.	○	×
B388	Station type setting error (parameter)	The station type in the station information parameter (address 20H to 5FH) was set to "other than 0 to 2".	Set to a value between "0 and 2".	○	×
B38B	Remote device station setting error (parameter)	The number of remote device stations was set to "43 stations or more" with the station information parameter (address 20H to 5FH).	Set the remote device station to "42 stations or less" with the station information parameter.	○	×
B38C	Intelligent device station setting error (parameter)	The number of intelligent device stations (including local stations) was set to "27 stations or more" with the station information parameter (address 20H to 5FH).	Set the intelligent device station to "26 stations or less" with the station information parameter.	○	×
B38E ＊1	Communication buffer assignment error (parameter)	The total size of the communication buffers in the station information parameter (address 20H to 5FH) exceeded 4 k words.	Set the total size of the communication buffers to 4 k words or less.	○	×
B38F ＊1	Automatic update buffer assignment error (parameter)	The total size of the automatic update buffer in the station information parameter (address 20H to 5FH) exceeded 4 k words.	Set the total size of the automatic update buffer to 4 k words or less.	○	×
B390	Standby master station specification error (parameter)	The standby master station parameter (address 4H) was set to a value other than "1 to 64".	Specify the standby master station to a value within the range from "1 to 64".	○	×

＊1: Error code added to the function version B or later.

Table 13.1 Error code list (3/6)

Error code (hexadecimal)	Error details	Cause of error occurrence (details)	Corrective action	Detectability	
				Master station	Local station
B391	Retry count setting error (parameter)	The retry count parameter (address 2H) was set to a value other than "1 to 7".	Set a value within the range from "1 to 7".	○	×
B392	Operation when CPU is down specified error (parameter)	The operation when the CPU is down specification parameter (address 6H) was set to a value other than "0 or 1".	Set "0 or 1".	○	×
B393	Scan mode specification error (parameter)	The scan mode parameter (address 7H) was set to a value other than "0 or 1".	Set "0 or 1".	○	○
B394	Number of automatic return stations setting error (parameter)	The number of automatic return stations parameter (address 3H) was set to a value other than "1 to 10".	Set a value within the range from "1 to 10".	○	×
B396	Station number overlap error (parameter)	A duplicate station number was specified with the station information parameter (address 20H to 5FH).	Set so that station numbers are not duplicated.	○	×
B397	Station information setting error (parameter)	The station information parameter (address 20H to 5FH) setting does not meet the following condition: (16 × A) + (54 × B) + (88 × C) ≦ 2304 A: Number of remote I/O stations B: Number of remote device stations C: Number of intelligent device stations (including local stations)	Set the parameter so that it meets the condition shown on left.	○	×
B398	Number of occupied stations setting error (parameter)	The number of occupied stations in the station information parameter (address 20H to 5FH) was set to a value other than "1 to 4".	Set a value within the range from "1 to 4".	○	×
B399	Number of connected modules setting error (parameter)	The number of connected modules parameter (address 1H) was set to a value other than "1 to 64".	Set a value within the range from "1 to 64".	○	×
B39A ＊1	Standby master station specification error (loading status)	The status setting switch of the station number different from that specified with the parameter is set in the standby master station.	Confirm the parameter or status setting switch.	×	○
B39B	Reserved station setting error (parameter)	The parameter's reserve station specification is set to all reserve stations.	Check the parameter's reserve station specification.	○	×
B39C ＊1	Standby master station setting error	The station information of the station number specified as the standby master station has been set to other than the intelligent device station.	Correct the station information of the station specified as the standby master station to be the intelligent device station.	○	×
B401 ＊1	Parameter change error	Parameter change was executed during transient request.	Change the parameter after all transient requests are completed or before any are requested.	○	○
B404 ＊1	Response error	A response from the requested station was not returned within the watchdog time period.	Set a longer watchdog time. If an error persists, check the requested module and cables.	○	○
B405 ＊1	Transient applicable station error	A transient request was made to a remote I/O station or a remote device station.	Set the corresponding station to a local station or an intelligent device station.	○	○
B406 ＊1	RY simultaneous ON error	RY is turned ON before the response is complete, or a request is issued without turning RY off.	After the response is complete, always turn RY off before sending a request.	○	○
B407 ＊1	Transient communication number unmatched error	The request data number is different from the response data number.	Check the line.	○	○

＊1: Error code added to the function version B or later.

Table 13.1 Error code list (4/6)

Error code (hexadecimal)	Error details	Cause of error occurrence (details)	Corrective action	Detectability	
				Master station	Local station
B510 ＊2	Transmission channel in use (host station)	A channel being used was used.	The same channel cannot be used simultaneously. Change the channel number, or try not to use the same channel simultaneously.	○	○
B511 ＊2	Receive channel in use	The channel of the target station is in use.	Wait for a while before executing the SEND instruction again. Check whether there are multiple requests to the same channel of the target station from the local station or multiple stations.	○	○
B512 ＊2	Arrival wait time out	The arrival watchdog time has elapsed (when the number of retransmission is 0), or the RECV instruction was executed even though the RECV instruction execution request flag was not on.	When the error occurs with a RECV instruction, increase the value of arrival watchdog time if other stations are executing SEND instructions. If the local station is executing instructions, increase the value of arrival watchdog time. If the error persists, check the network and the target station.	○	○
B513 ＊2	Number of retries count over	When the send/receive instruction was used, the number of retries exceeded the set number.	Increase the arrival watchdog time. If the error persists, check the network and the target station.	○	○
B515 ＊2	Channel number error	The channel number is out of the setting range.	Set the channel at the local and target stations to either 1 or 2.	○	○
B518 ＊2	Number of retransmissions error	The number of retransmissions is out of the setting range.	Set it in the range of 0 to 15 (times).	○	○
B519 ＊2	Arrival watchdog time error	The arrival watchdog time is out of the setting range.	Set it in the range of 0 to 32767 (seconds).	○	○
B51A	Send data length error	The length of send data is out of the setting range.	Set it within the range of "1 to 480 (words)".	○	○
B520 ＊2	Transmission destination station number error	The value "other than 0" is set for the target station number.	Set the target station number to "0."	○	○
B524 ＊2	Transmission destination station CPU error	There is an error in the CPU at the transmission destination station.	Check the CPU of the transmission destination station.	○	○
B601 ＊1	Request type error	An unsupported request was received.	Check the contents of the request, as well as the target station number.	○	○
B602 ＊1	Transient request overload error	There are too many transient requests to the corresponding station.	Wait a while and then send the requests (transient overload status).	○	○
B603 ＊1	Transient request overload error	There are too many transient requests to the corresponding station.	Wait a while and then send the requests (transient overload status).	○	○
B604 ＊1	Line test in processing	Transient transmission was sent when a line test was in progress.	Wait a while and then retransmit.	○	×
B605 ＊1	Transient storage buffer could not be obtained	Transient storage buffer could not be obtained.	Wait a while and then retransmit.	○	○
B607 ＊2	Target station CPU error	There is an error in the target station's CPU.	Check the target CPU.	○	○
B771 ＊2	Transient request overload error	There are too many transient requests to the corresponding station.	Wait a while and then retransmit (transient overloaded status).	○	○
B774 ＊2	Transient request error	The target station was not an intelligent device station.	Check if the target station is an intelligent device station.	○	○
B778 ＊2	Response time out	A response was not received from the requested station.	Check the requested module and cables.	○	○
B783	Transient storage buffer error	An error occurred in the transient storage buffer when a transient transmission of greater than 1 k was being performed.	Wait a while and then retransmit.	○	○

＊1: Error code added to the function version B or later.

＊2: Error code added to the software version J (manufactured in Jan., 1998) or later.

Table 13.1 Error code list (5/6)

Error code (hexadecimal)	Error details	Cause of error occurrence (details)	Corrective action	Detectability	
				Master station	Local station
B801 ＊1	Access code setting error	A non-existing access code/attribute was set.	Set a correct access code/attribute.	○	○
B802 ＊2	Access code error	An access code that does not exist was used.	Use the correct access code.	○	○
B803 ＊1	Data points error	The number of data points were out of range.	Set the number of data points to within 1 to 960 bytes.	○	○
B804 ＊1	Attribute definition error Transient transmission unsupported station specification error	The attribute definition was invalid. Alternatively, transient transmission was performed even though the target station does not support transient transmission.	Review the attribute definition. Check the designation of the target station number, as well as the function version and software version of the target local station.	○	○
B805 ＊1	Data points error	The number of data was out of range.	Set the range to within 1 to 100 when writing, and 1 to 160 when reading.	○	○
B807 ＊1	Device No. error	The start device No. is out of range. Or, the address was not a multiple of 16 when the bit device was accessed.	Correct the start device No.. Or, set the address to a multiple of 16 when accessing the bit device.	○	○
B80D ＊2	Setting range error	The specified combination (addresses and points) exceeded the valid processing range.	Set so that the number of processing points does not exceed the device range .	○	○
B814 ＊2	File register capacity setting error	The file register capacity was not specified.	Specify the file register capacity.	○	○
B815 ＊2	Module mode setting error	A transient transmission was executed when the target station was set to the I/O mode.	Set to the intelli mode.	○	○
B823	Remote control mode error	The mode setting of the remote control was incorrect.	Check the mode specification.	○	○
B901	E^2PROM error	When a parameter registration request (YnA) to E^2PROM was executed, E^2PROM was out of order or exceeded its write limit (10,000 times).	Replace the module.	○	×
B902	Error in data link startup by E^2PROM parameter	Data link start request by E^2PROM parameter (YnB) was executed even though the parameter was not registered in E^2PROM.	Register the parameter to E^2PROM by a parameter entry request (YnA).	○	×
B903 ＊1	Transient request error	A transient request was issued to a station that has not secured a communication buffer area.	Secure a communication buffer area with a parameter.	○	○
B904 ＊1	Communication buffer size setting error	The communication buffer size of the corresponding station was out of range when a dedicated instruction was executed.	Set the communication buffer size of the corresponding station within the range.	○	○
B905 ＊1	Transient data length error	When the dedicated instruction is executed, the transient data length is greater than the communication buffer size of the corresponding station.	Make the communication buffer size of the corresponding station greater than the transient data length.	○	○
B907 ＊3	Execution disabled during data link	E^2PROM erasure request (YnD: ON) was executed during data link (SB006E: ON).	Execute a data link stop using SW0002.	○	×
B912 ＊3	No registration area	The parameter registration request to E^2PROM (YnA: ON) was executed in excess of a maximum of 127 registration times.	Execute the E^2PROM erasure request (YnD: ON), switch power off, or reset the CPU.	○	×
B913 ＊3	E^2PROM fault	The parameter registration request to E^2PROM (YnA: ON) was executed but E^2PROM is faulty.	Change the module.	○	×
BA19	Corresponding station error	The corresponding station that is being tested stopped communication during line test 1.	Check the cable and the corresponding station.	○	×
BA1B	All stations error	All stations stopped communications during line test 1.	Check the cables.	○	×

＊1: Error code added to the function version B or later.

＊2: Error code added to the software version J (manufactured in Jan., 1998) or later.

＊3: Error code added to the software version E (manufactured in Aug., 2001) or later of the A1SJ61QBT11.

Table 13.1 Error code list (6/6)

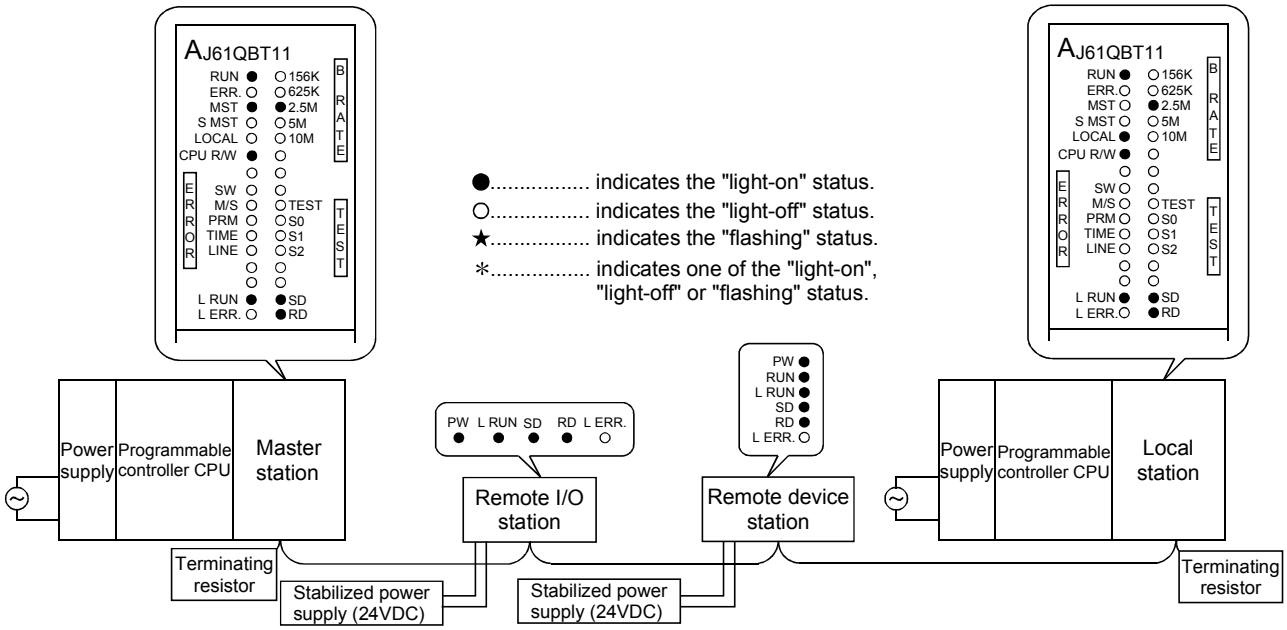
Error code (hexadecimal)	Error details	Cause of error occurrence (details)	Corrective action	Detectability	
				Master station	Local station
BBC1	Mode setting error (switch)	The mode setting switch is set outside the range.	Set it within the range.	○	○
BBC2	Station number setting error (switch)	The station number setting switch setting of the module is other than "0 to 64". Alternatively, the last station number is greater than 64.	Check the station number and the number of occupied stations of the module.	○	○
BBC3	Transmission speed setting error (switch)	Module's transmission speed setting switch is set out of the range of "0 to 4".	Set it in the range of "0 to 4."	○	○
BBC4	Station type change error (station number)	An attempt was made to change the master station (0) to the local station (1 to 64), or the local station (1 to 64) to the master station (0) by executing a module reset (Yn4).	Change by resetting the programmable controller CPU.	○	○
BBC5	Master station overlapping error	Multiple master stations exist on the same line. Alternatively, line noise was detected at power on.	Reduce the number of master stations on the same line to one. Alternatively, check the line status.	○	×
BBC6	Mode change error	An attempt was made to change the mode from 0 or 2 to the test mode by executing a module reset (Yn4).	Change by resetting the programmable controller CPU.	○	○
BBC7	Module error	Module is defective.	Replace the module.	○	○
BD85	Hardware error detection	A hardware error was detected.	The possible cause is the hardware failure of the AJ61QBT11/A1SJ61QBT11, CPU module, base unit, or other modules. Please consult your local Mitsubishi representative.	○	○
BFFE	CPU monitoring timer time out	The CPU monitoring timer timed out.	Check the operation of the target station.	○	○
C000 to CFFF	An error detected in an Ethernet interface module Take a corrective action, referring to the troubleshooting description in the Ethernet Interface Module User's Manual.				
D000 to DFFF	An error detected in CC-Link IE Field Network Take a corrective action, referring to the troubleshooting description in the CC-Link IE Field Network User's Manual.				
E000 to EFFF	An error detected in CC-Link IE Controller Network Take a corrective action, referring to the troubleshooting description in the CC-Link IE Controller Network Reference Manual.				
F000 to FFFF	An error detected in a MELSECNET/H and MELSECNET/10 network system Take a corrective action, referring to the troubleshooting description in the MELSECNET/H or MELSECNET/10 Network System Reference Manual.				

13.4 LED Display Status

The LED display status of each station for each data-link (system) status is shown below, where the transmission speed is set at 2.5 Mbps.
Refer to Troubleshooting.

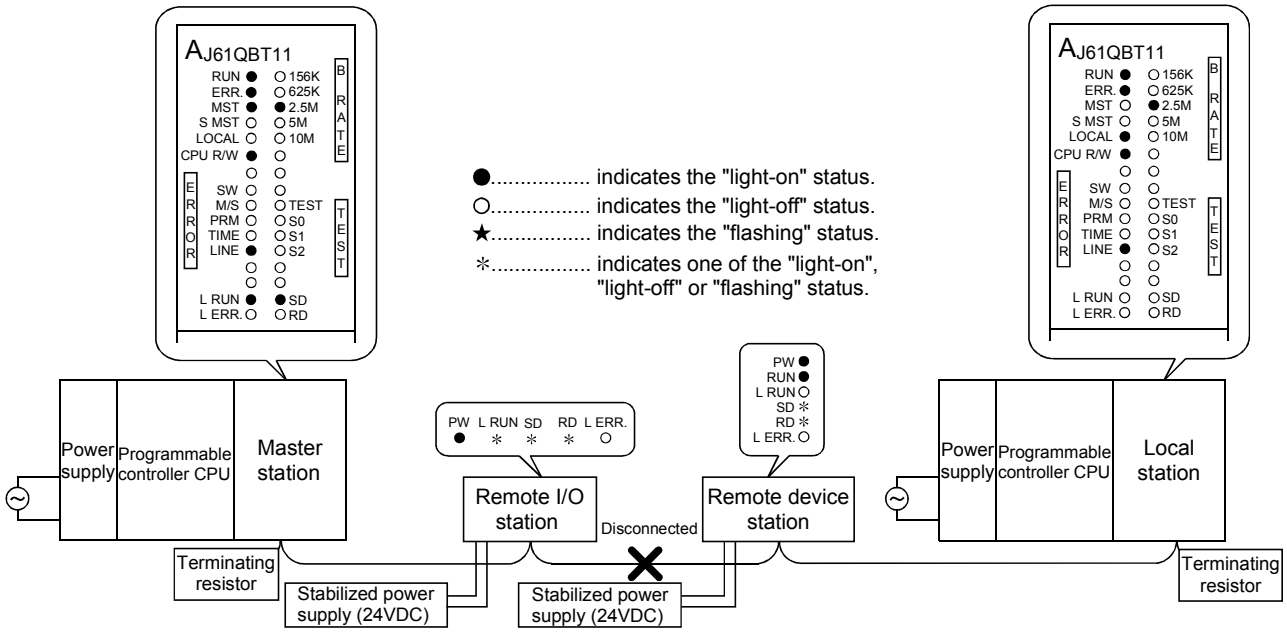
13.4.1 When data link is normal

The "PW", "RUN", "L RUN", "SD" and "RD" LEDs are on.



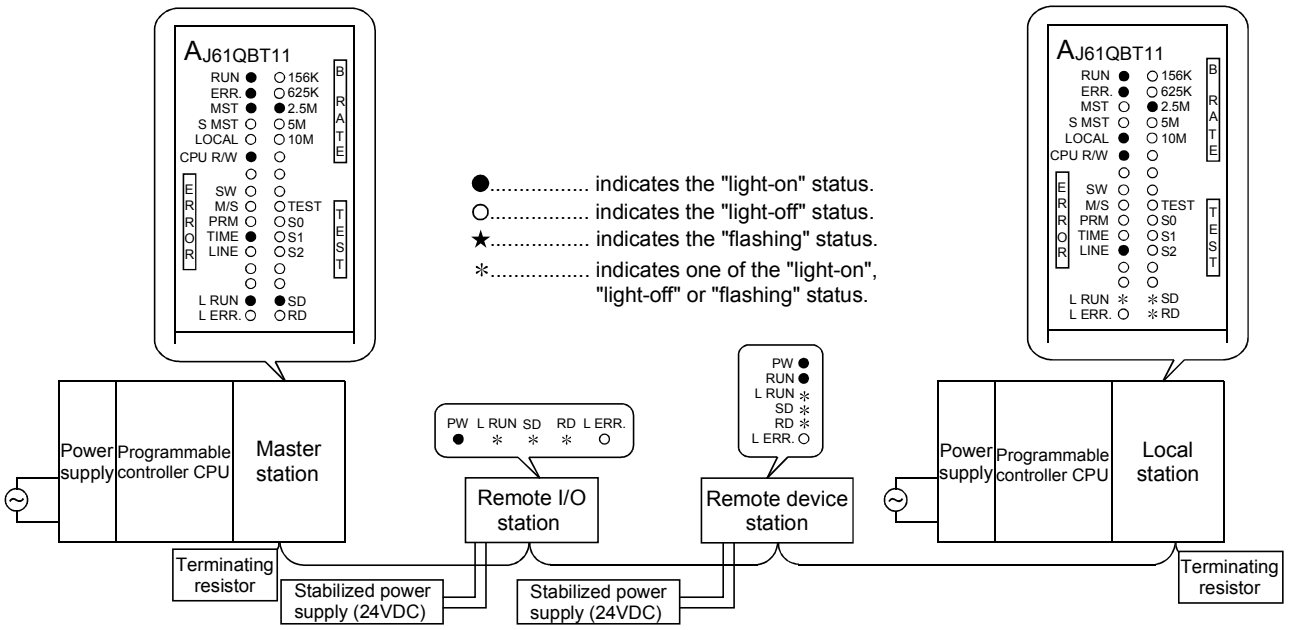
13.4.2 When a cable is disconnected

Data link for all the stations is lost.
You cannot identify the location of wire breakage by the LED indications.



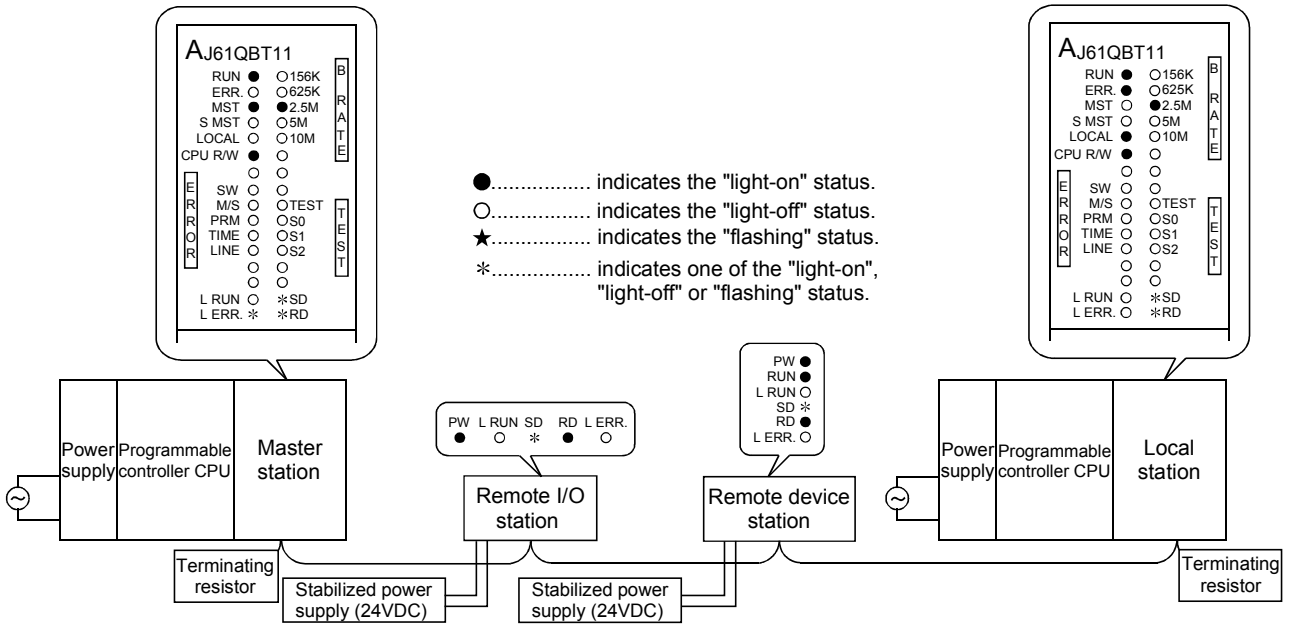
13.4.3 When a cable is shorted

Data link for all the stations is lost.
You cannot identify a short circuit occurred by the LED indications.



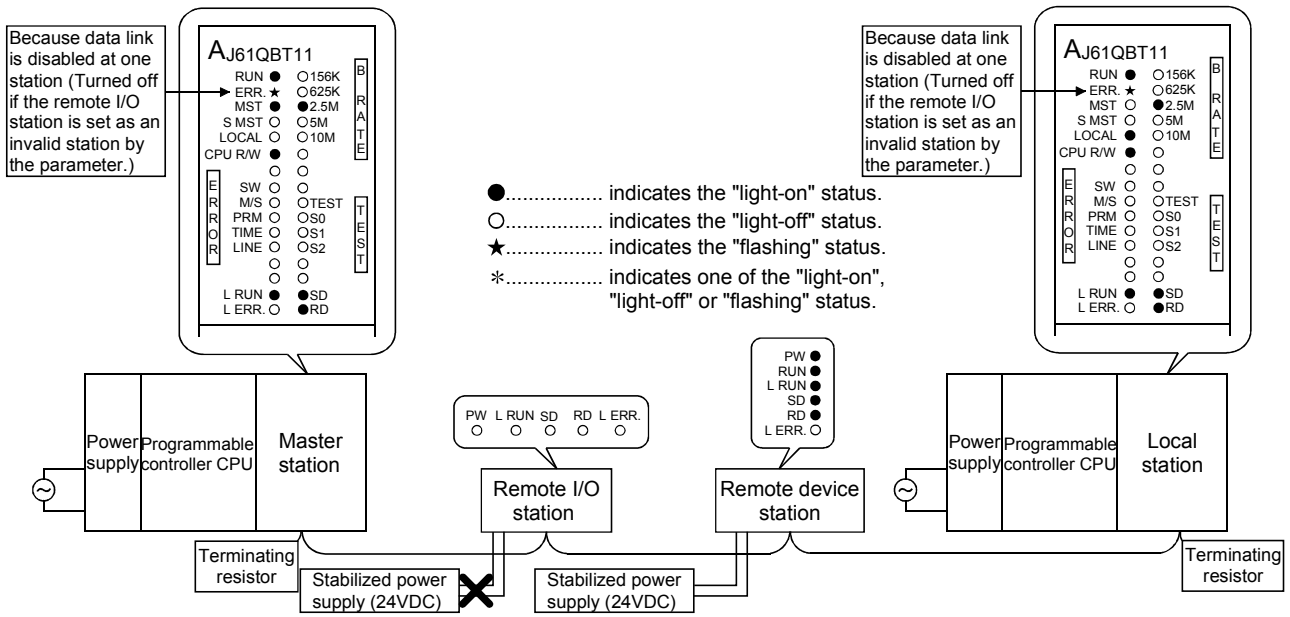
13.4.4 When the link is stopped at the master station

All stations will not be able to perform data link.
The "L RUN" LED turns off for all stations except for the master station.



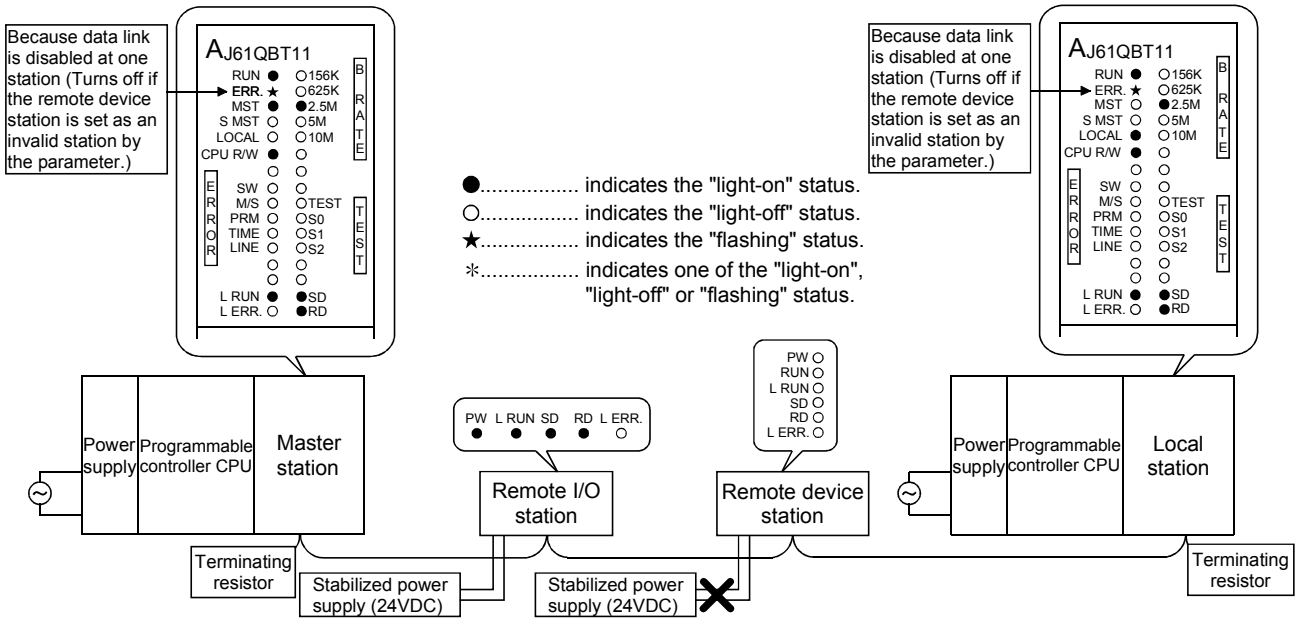
13.4.5 When power supply to a remote I/O station is turned off

Data link is continued excluding that remote I/O station.
"ERR." LEDs at the master station and the local station flash.



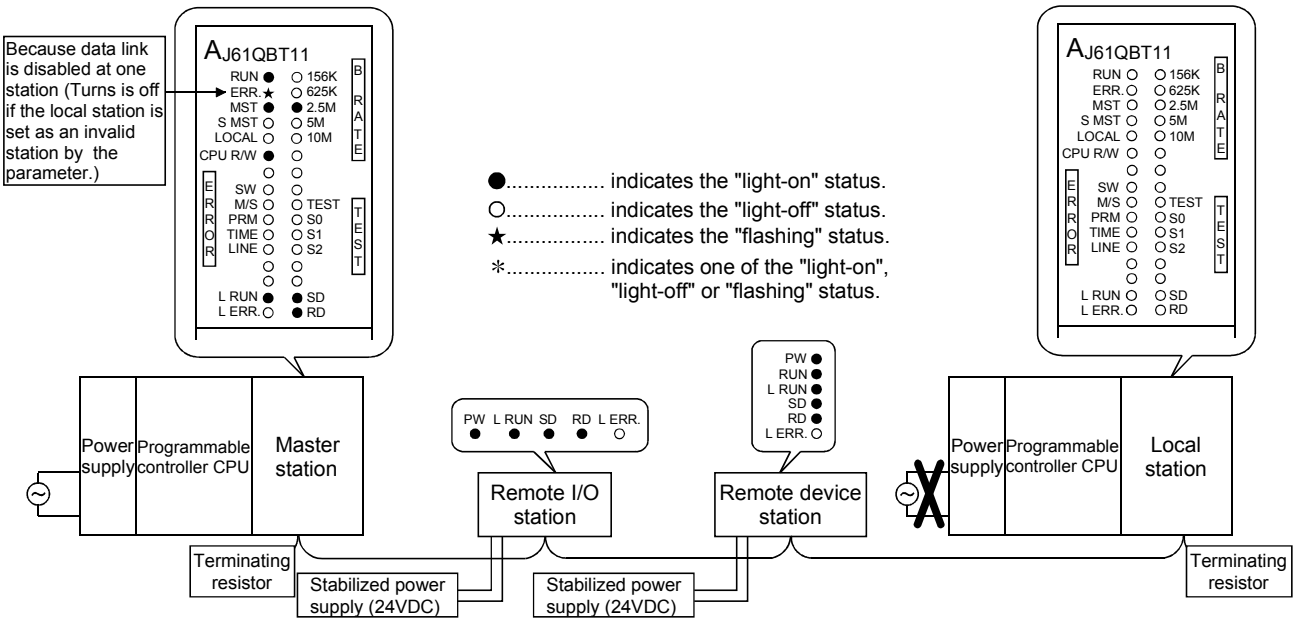
13.4.6 When the power supply to a remote device station is turned off

Data links is continued excluding that remote device station.
The "ERR." LEDs at the master station and the local station flash.



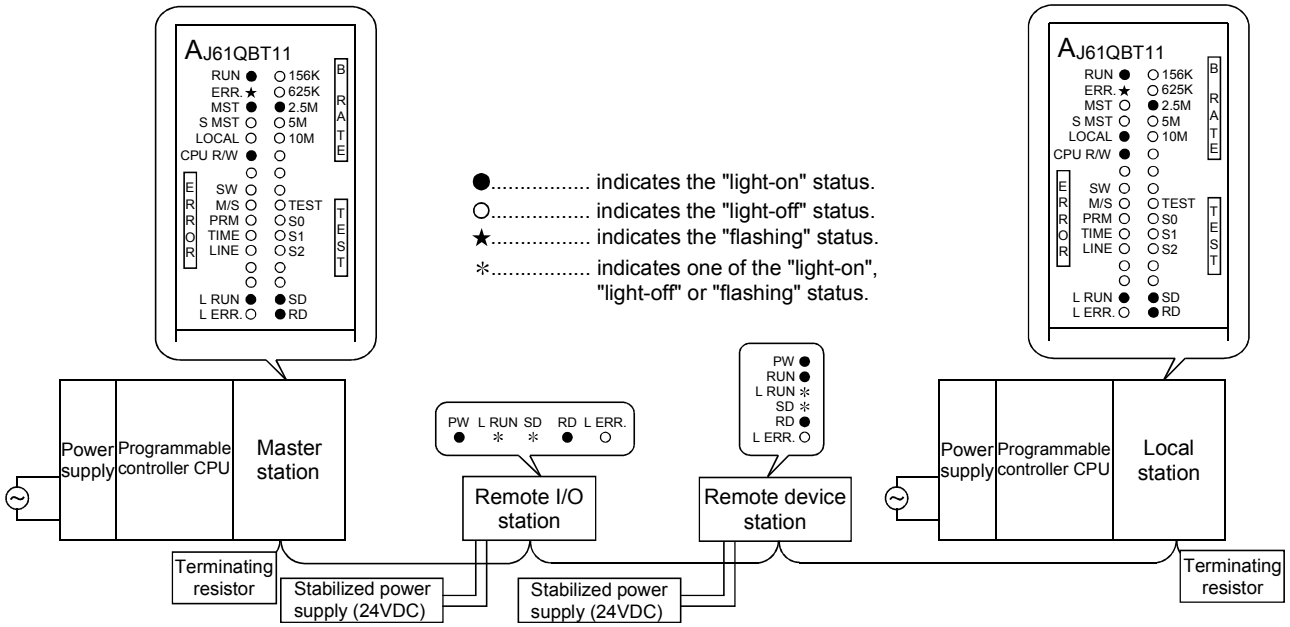
13.4.7 When the power supply to the local station (programmable controller CPU) is turned off

Data link is continued excluding the local station.
The "ERR." LED at the master station flashes.



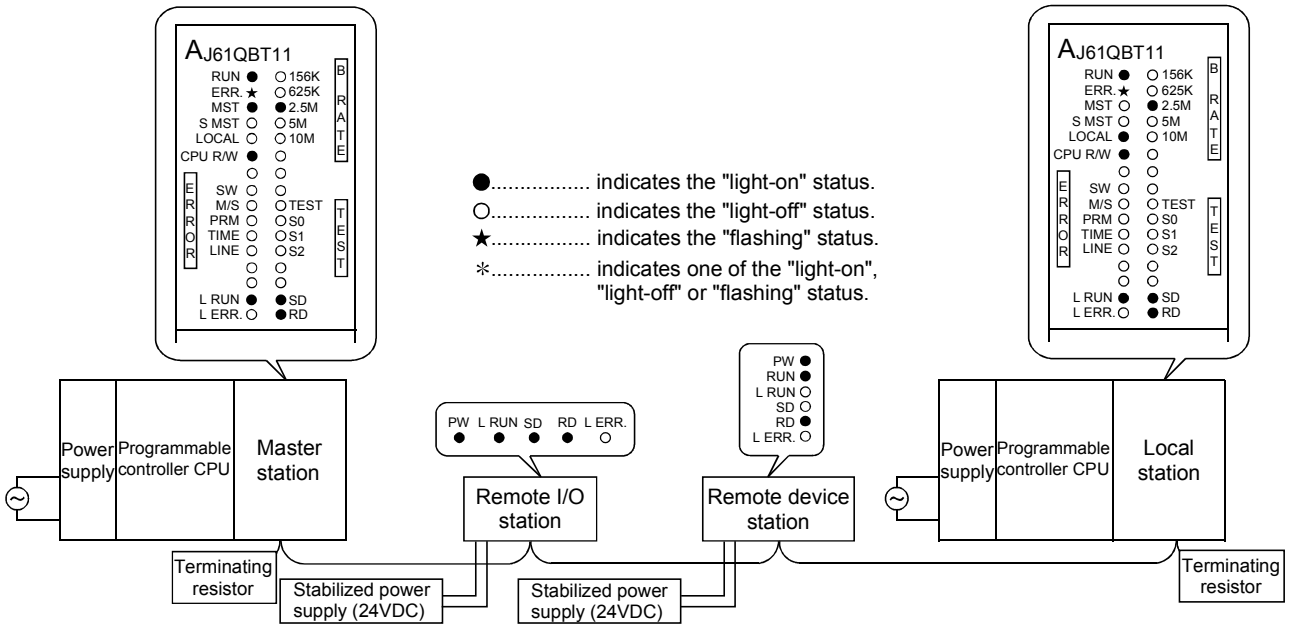
13.4.8 When the station numbers are duplicate

This is a case where the settings for a remote I/O station and a remote device station are duplicate. A skipped number (no slave station exists) result in the system because of overlapped station number, so the "ERR." LED on the master station flashes.



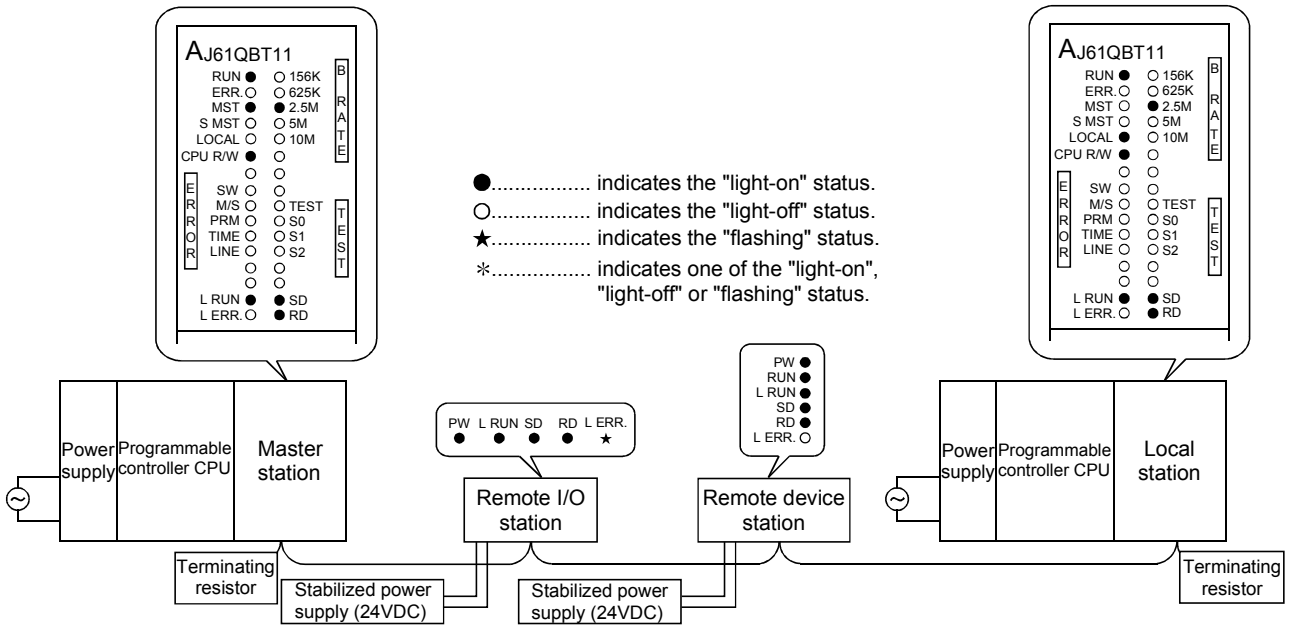
13.4.9 When the transmission speed is set incorrectly

This is a case where the transmission speed for the remote device station is set incorrectly.
The "L RUN" LED for the remote device station with the incorrect transmission-speed setting turns off.



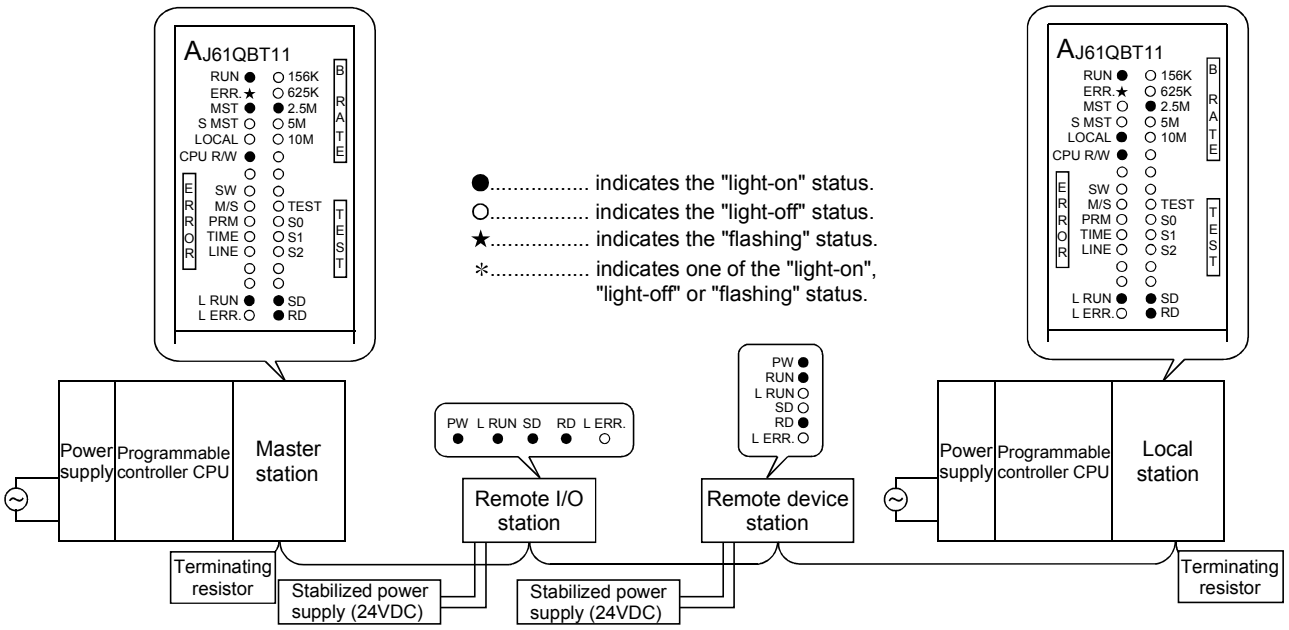
13.4.10 When the switch setting is changed during data link

This is a case where the switch setting for the remote I/O station was changed.
The "L ERR." LED for the remote I/O station whose switch setting was changed flashes. However, data link can be continued. Also, if returned to the previous state, "L ERR." turns off.



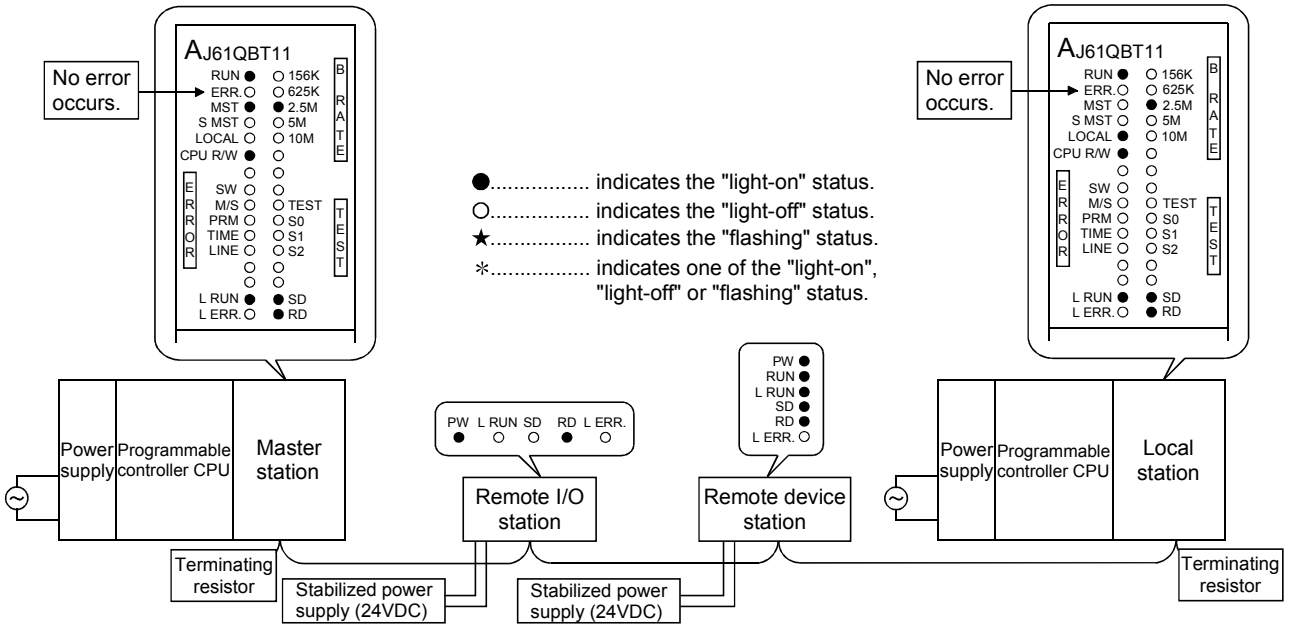
13.4.11 When data link is started with the switch set outside the range

This is a case where data link was started with the switch set outside the range.
The "L RUN" and "SD" LEDs at the remote device station turn off and "L ERR." LED is turn on.



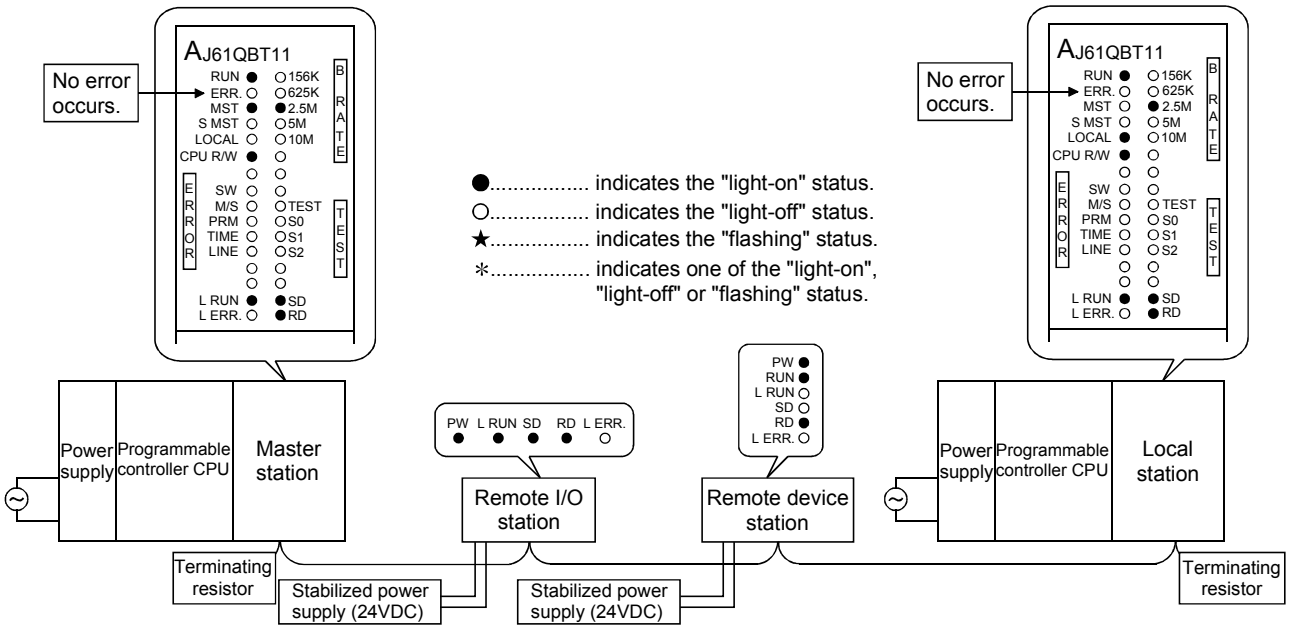
13.4.12 When the remote I/O station is not set by the parameter (i.e., is set as reserved)

No data links can be performed with the remote I/O station at all, and no error occurs.
The "L RUN", "SD" LEDs at the remote I/O station turn off.



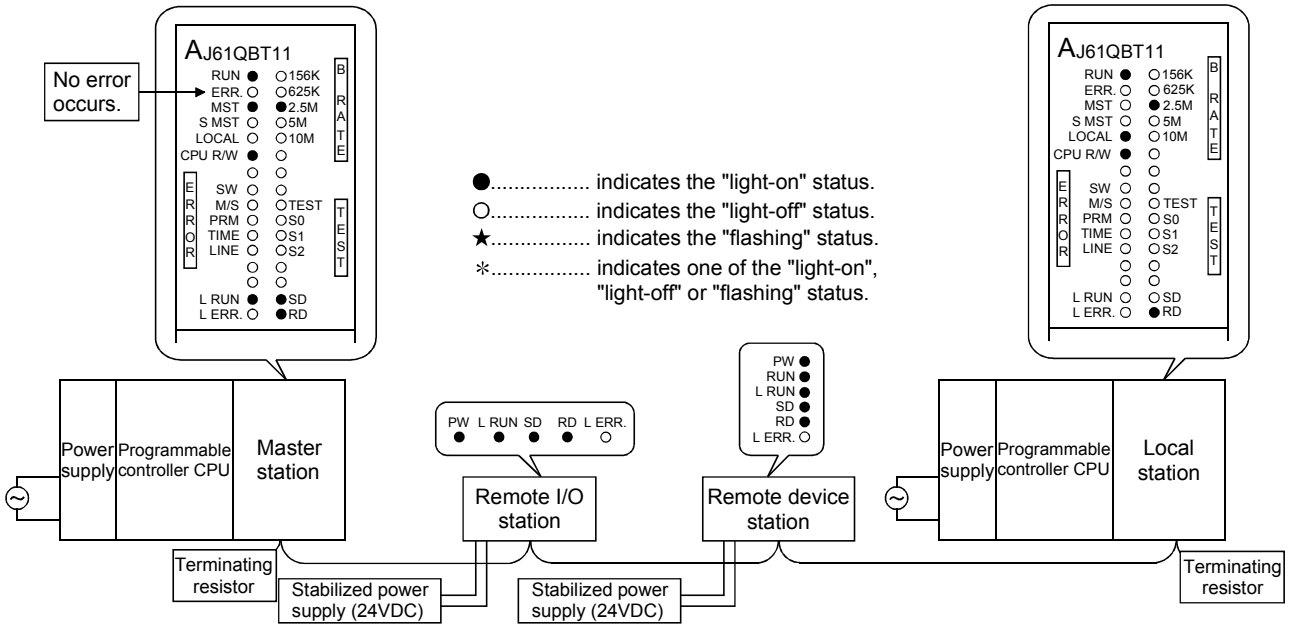
13.4.13 When the remote device station is not set by the parameter (i.e., is set as reserved)

No data link can be performed with the remote device station at all, and no error occurs.
The "L RUN", "SD" LEDs at the remote device station turn off.



13.4.14 When the local station is not set by the parameter (i.e., is set as reserved)

No data link can be performed with the local station at all, and no error occurs.
The "L RUN", "SD" LEDs at the local station turn off.



14. OVERVIEW (FUNCTION VERSION B OR LATER)

The functions available with the master and local modules depend on their function versions and CPU types, as shown in Table 14.1.

Table 14.1 List of available functions with different function versions

Function	Description	Detailed description	Function version	
			A	B or later
Parameter registration	CPU module	Sets parameters from a peripheral device as a part of CPU parameters and notifies when the power is turned on or status is changed from STOP → RUN.	–	○ ∗2∗3
	Buffer memory	The method to write directly into the buffer memory in the module and receive notification.	○	○
	E^2PROM	The method to register to the E^2PROM in the module and receive notification.	○	○
Automatic refresh		Cyclic transmission data, such as RX and RY, can be refreshed to a desired device by the END processing specified from a peripheral device.	–	○ ∗2∗3
Scan synchronization	Synchronous mode	Data link can be performed using the scan synchronized with the sequence program.	–	○ ∗2∗3
	Asynchronous mode	Data link can be performed using the scan not synchronized with the sequence program.	○	○
Cyclic transmission	Bit transmission	Data communication can be performed at 32 points per station.	○	○
	Word transmission	Data communication can be performed at 4 points per station.	○	○
Transient transmission	Dedicated instructions	Transient transmission can be performed to the intelligent device and local station using dedicated instructions.	–	○ ∗1∗3
		Device read/write with respect to the CPU in the specified station is possible using dedicated instructions.	–	○ ∗1∗3 ∗4
	Communication instruction	Data communication with other stations is possible. Data read/write with other stations is also possible.	–	○ ∗1∗3 ∗4
Remote I/O net mode		Communication can be performed only with the remote I/O station without setting parameters.	–	○∗5
Reserved station setting		Stations to be connected later can be skipped and set in advance.	○	○
Error detection invalid station setting		Data link error can be ignored when data link is disabled at any station.	○	○
Temporary error invalid station setting		Replacement of modules can be performed online without detecting an error at the corresponding remote station.	–	○
Module reset		Only CC-Link can be reset when changing switches, etc., without stopping the CPU.	○	○
Data link stop/restart		Stop/restart can be performed during data link.	○	○
RAS	Automatic return	The station which has been disconnected from data link can be returned automatically to the data link through normal return.	○	○
	Standby master	Data link can be continued when an error occurs at the master station, by switching to the standby master station.	–	○
	Slave station disconnection	The station at which data link has been disabled can be disconnected so that data link can be continued using normal stations only.	○	○
	Confirmation of data link status	The data link status can be confirmed using the special relay and special register.	○	○
	Off-line test	A hardware test, line test, etc., can be performed.	○	○
	On-line test	Line testing and control of link such as starting up and stopping can be performed from a peripheral device.	○∗2	○∗2
	Monitor/diagnosis	Monitoring and diagnosing can be performed from a peripheral device.	○∗2	○∗2

POINT

Functions marked with ∗1 are available only when a CPU of function version B or later is used.
Functions marked with ∗2 are available only when a CPU of function version B or later and the SW2IVD-GPPQ/SW2NX-GPPQ or later software package are used.
The functions denoted ∗3 cannot be used when a remote I/O station of MELSECNET/10 is installed.
Functions marked with ∗4 are available with software version J (manufactured in Jan., 1998) or later.
Functions marked with ∗5 are available with the combination of the master module of software version P (manufactured in Sep., 1998) or later and the CPU specified in Section 15.8.

15. FUNCTIONS (FUNCTION VERSION B OR LATER)

The functions added in the function version B or later are explained.

15.1 List of Functions

A list of functions is shown in Table 15.1.

Table 15.1 List of functions

Item	Function overview		Reference section	Availability of functions		
				Master station	Local station	Standby master station
Parameter registration function	Sets parameters from a peripheral device as a part of CPU parameters. The following two parameters are available: • Network parameters • Automatic refresh parameters		Section 15.2	○	○∗1	○∗1
Automatic refresh function	Cyclic transmission data, such as RX and RY, can be refreshed to a desired device by the END processing, using the software package (∗2).		Section 15.3	○	○	○
Scan synchronous function	Synchronous mode	Data link can be performed using the scan synchronized with the sequence program.	Section 15.4	○	×	×
	Asynchronous mode	Data link can be performed using the scan not synchronized with the sequence program.	Section 15.4	○	○	○
Standby master function	Data link can be continued when an error occurs at the master station, by switching to the standby master station.		Section 15.5	×	×	○
Dedicated instructions	Transient transmission can be performed to the intelligent device and local stations using dedicated instructions. Dedicated instructions also facilitate read/write of data with handshake from/to remote devices.		Section 15.6	○	○	○
	Device read/write with respect to the CPU in the specified station is possible using dedicated instructions.		Section 15.6	○∗2	○∗2	○∗2
Communication instruction	Data communication with other stations is possible. Data read/write with other stations is also possible.		Section 15.7	○ ∗2∗3	○ ∗2∗3	○ ∗2∗3
Remote I/O net mode	Communication can be performed only with the remote I/O station without setting parameters.		Section 15.8	○∗4	×	×
Temporary error invalid station specification function	Replacement of modules can be performed online without detecting an error at the corresponding remote station.		Section 15.9	○	×	×
Online test function	Line testing and control of link such as starting up and stopping can be performed from a peripheral device.		Section 15.10	○	○	○
Monitor/diagnosis function	Monitoring and diagnosing can be performed from a peripheral device.		Section 15.11	○	○	○

∗1 Network parameter setting is not necessary.
∗2 It can be used with software version J (manufactured in Jan., 1998) and later.
∗3 The CPU of the specified station can only be used with QnACPU.
∗4 Available with software version P (manufactured in Sep., 1998) or later.

15.2 Parameter Registration Function

This function sets parameters as a part of CPU parameters from a peripheral device, using SW□IVD/SW□NX-GPPQ/GX Developer. There are two types of parameters: network parameter and automatic refresh parameter.
For SW□IVD/SW□NX-GPPQ/GX Developer, refer to the operating manual supplied with the product.

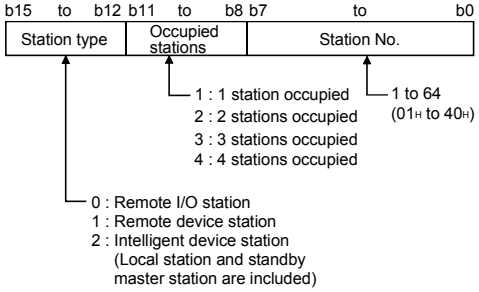
POINT

• The parameter registration function is effective only up to eight master modules. When using nine or more master modules, it must be done from the sequence program.
• The "Y" at the master module will be ignored while using the parameter registration function.

15.2.1 Network parameters

Network parameters are used for performing data link. The items that are set by the network parameters are shown in Table 15.2.

Table 15.2 Network parameters

Setting item	Description	Buffer memory address	
		Hex.	Dec.
Number of connected modules	Sets the number of remote stations, local stations, intelligent device stations, and standby master station connected to the master station. (Includes reserved stations.) Default value : 64 (modules) Setting range : 1 to 64 (modules)	1H	1
Number of retries	Sets the number of retries during the communication error. Default value : 3 (times) Setting range : 1 to 7 (times)	2H	2
Number of automatic return modules	Sets the number of remote stations, local stations, intelligent device stations, and standby master station that can be returned by one link scan. Default value : 1 (module) Setting range : 1 to 10 (modules)	3H	3
Standby master station specification	Specifies the station number of the standby master station. Default value : 0 (0: No standby master station specified.) Setting range : 0 to 63 (0: No standby master station specified.)	4H	4
Operation specification when CPU becomes faulty	Specifies the data link status when a master station programmable controller CPU error occurs. Default value : 0 (stop) Setting range : 0 (stop) 1 (continue)	6H	6
Scan mode specification	Specifies the synchronous or asynchronous mode for sequence scan. Default value : 0 (asynchronous) Setting range : 0 (asynchronous) 1 (synchronous)	–	–
Delay time setting	Set 0 for the delay time.	8H	8
Reserved station specification	Specifies the reserved station. Default value : 0 (Not set) Setting range : Turn on the bit corresponding to the station number.	10H to 13H	16 to 19
Error invalid station specification	Specifies the error invalid station. Default value : 0 (Not set) Setting range : Turn on the bit corresponding to the station number.	14H to 17H	20 to 23
Station information	Sets the type of the connected remote stations, local stations, intelligent device station, and standby master station. Default value : 0101H (remote I/O station, 1 station occupied, station number 1) to 0140H (remote I/O station, 1 station occupied, station number 64) Setting range : See below. 	20H (first module) to 5FH (64th module)	32 (first module) to 95 (64th module)

Setting item	Description	Buffer memory address	
		Hex.	Dec.
Allocation of communication buffer and automatic update buffer	Specifies the size of the buffer memory that is allocated during the transient transmission to local, standby master or intelligent device stations. Default value Send buffer: 40H (64) (word) Receiving buffer: 40H (64) (word) Automatic updating buffer: 80H (128) (word) Setting range •Send/receive buffer : 0H (0) (word) (no setting) or 40H (64) (word) to 1000H (4096) (word) Note that the total size of the send/receive buffer is within 1000H (4096) (word). •Automatic update buffer : 0H (0) (word) (no setting) or 80H (128) (word) to 1000H (4096) (word) Note that the total size of the automatic update buffers is within 1000H (4096) (word).	80H (send buffer) 81H (receive buffer) 82H (automatic update buffer) } The first intelligent device to CBH (send buffer) CCH (receive buffer) CDH (automatic update buffer) } The 26th intelligent device	128 (send buffer) 129 (receive buffer) 130 (automatic update buffer) } The first intelligent device to 203 (send buffer) 204 (receive buffer) 205 (automatic update buffer) } The 26th intelligent device

POINT

(1) The scan mode cannot be specified with the TO instruction. Use GX Developer to make setting.
(2) For the communication buffer size, specify the size of the data to be sent or received plus 7 words.
(3) For the automatic update buffer size, allocate the size necessary for each intelligent device.

15.2.2 Automatic refresh parameters

Automatic refresh parameters are used to refresh all of the devices in the CC-Link to the CPU device during the END processing. The devices that can be set by the automatic refresh parameters are shown in Table 15.3.

Table 15.3 Automatic refresh parameters (Device that can be set)

CPU device / CC-Link device	Bit device									Word device							
	X	Y	M	B	T	ST	C	F	SB	D	W	T	ST	C	R	ZR	SW
RX	○		○	○						○	○				○	○	
RY		○	○	○	○	○	○			○	○	○	○	○	○	○	
RWw			○	○						○	○				○	○	
RWr			○	○						○	○				○	○	
SB			○	○						○	○				○	○	
SW			○	○						○	○				○	○	

15.3 Automatic Refresh Function

This function refreshes data to be cyclically transmitted data such as RX and RY to a desired device by the END processing specified in a peripheral device.
This eliminates the process to access the buffer memory using the FROM/TO instructions.
For details of setting from a peripheral device, refer to the SW□IVD/NX-GPPQ GPP Function Software Package Operating Manual (Offline) /GX Developer.

POINT

The automatic refresh function is effective only up to eight master module. When using nine or more master modules, it must be done from the sequence program.

15.4 Scan Synchronous Function

This function sets whether link scan is synchronized with the sequence scan, using the network parameter setting.

15.4.1 Synchronous mode

Performs data link using the scan synchronized with the sequence program. The operation overview in the synchronous mode is shown in Figure 15.1.
In general, the transmission delay is smaller in the synchronous mode than in the asynchronous mode.
Select the synchronous mode if the transmission delay is noticeably long.
However, as sequence scan is synchronized with link scan in the synchronous mode, the link scan is prolonged if the sequence scan is long. In this case, select the asynchronous mode.

Important

While in the synchronous mode, the scan time must not exceed the time specified for the corresponding transmission speed, as shown below. If the specified time is exceeded, a time out error occurs at each station and the station becomes faulty.

Transmission speed	Scan time
10Mbps	50ms
5Mbps	50ms
2.5Mbps	100ms
625kbps	400ms
156kbps	800ms

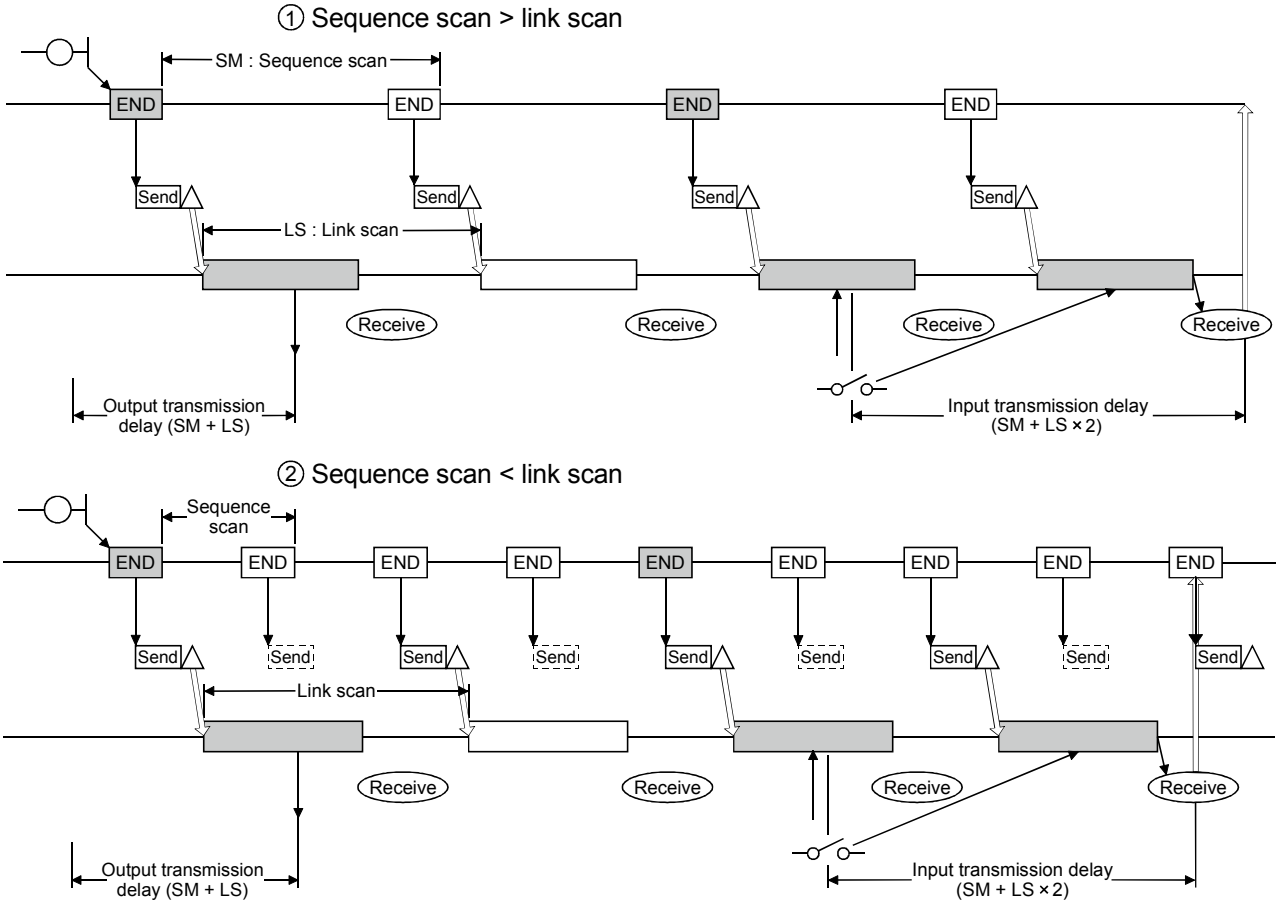


Figure 15.1 Operation overview in the synchronous mode

15.4.2 Asynchronous mode

Performs data link without synchronizing with the sequence program. The operation overview in the asynchronous mode is shown in Figure 15.2.

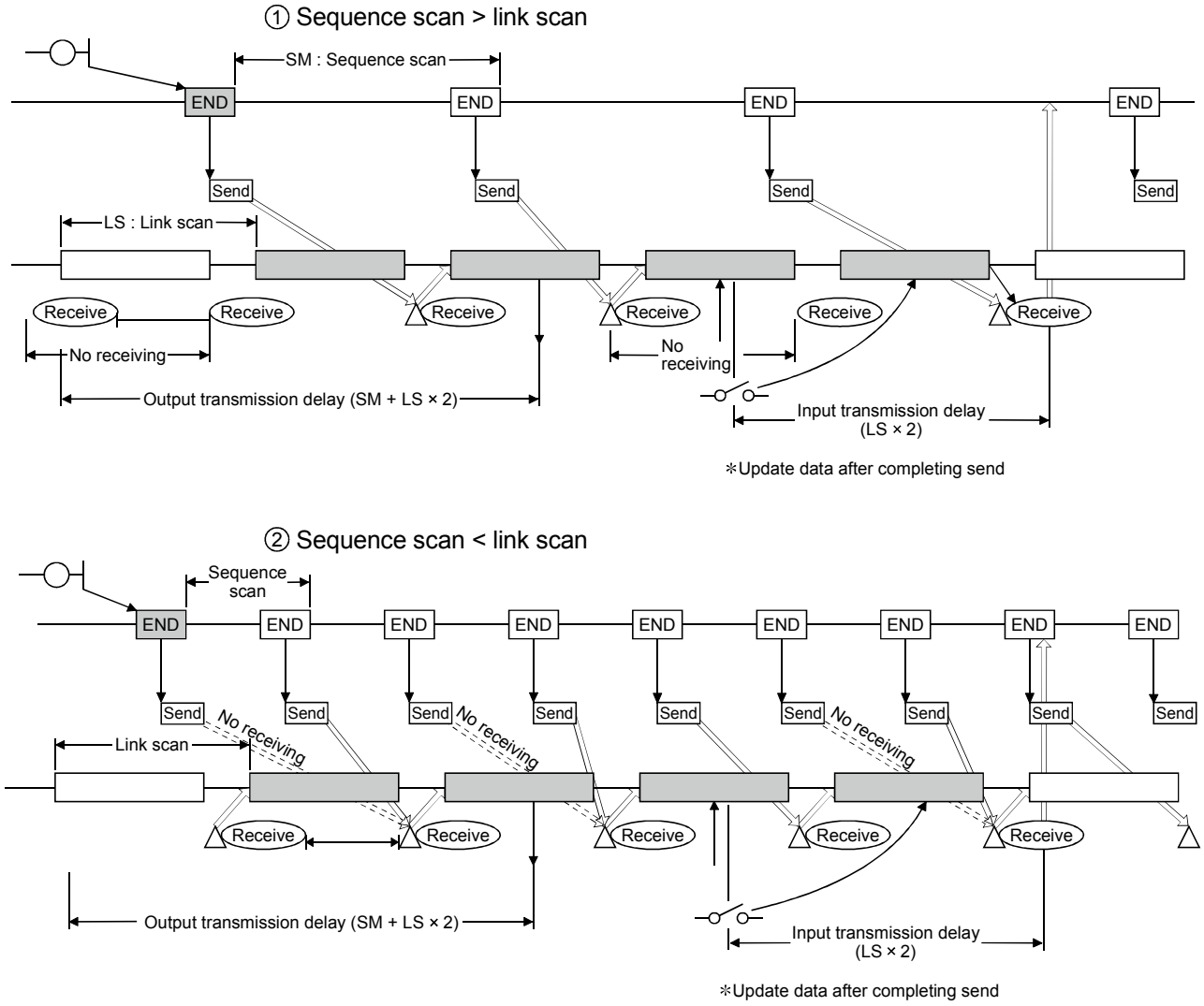


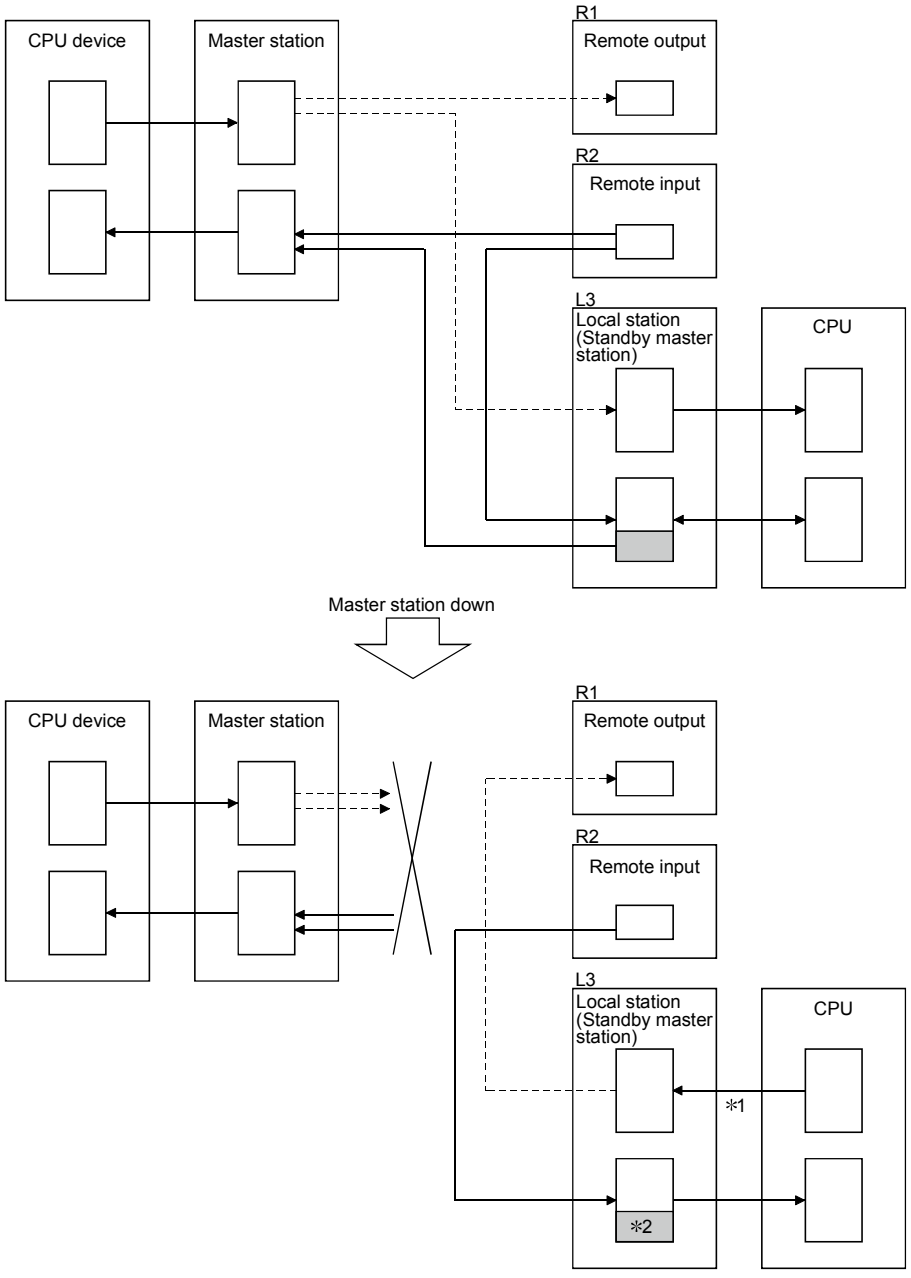
Figure 15.2 Operation overview in the asynchronous mode

15.5 Standby Master Function

This function allows data link to continue when an error occurs at the master station, by switching to the standby master station.
However, switching from the standby master station to the master station will not occur automatically when the master station returns.

15.5.1 Operation overview

The operation overview of the standby master function is shown in Figure 15.3.



*1: Accepts refresh from the CPU by the switching instruction of the link special relay (SB0001).
*2: The host area is retained/cleared (by the DIP switch).

Figure 15.3 Operation overview of the standby master function

15.5.2 Settings on using the standby master function

The settings on using the standby master function are as follows:

(1) Setting of the standby master station

1) Set the station number setting switch in the range of 1 to 63.
2) Turn on the condition setting switch SW1.

(2) Setting of the master station

1) Change the standby master station specification in the network parameter to the station number of the standby master station.

(3) Setting of the local station and remote station

Same as when no standby master station is used.

Important
The station number 64 cannot be used in the system where the standby master station exits. If used, the station number 64 cannot communicate correctly.

15.5.3 Link special relays/registers (SB, SW) relating to the standby master function

The link special relays and link special registers relating to the standby master function are explained.
They are stored in the buffer memory.

(1) Link special relays (SB)

The link special relays (SB) relating to the standby master function are as follows.
The figures in parentheses in the number column indicate buffer memory address and bit location.

Example: When buffer memory address is 5E0H and bit location is 0: (5E0H, b0)

Table 15.4 List of link special relays relating to the standby master function

Number	Name	Description	Availability (○ : available, × : not available)	
			Master station	Standby master station
SB0001 (5E0H, b1)	Master station switch data link start	Switches the output information from the standby master station to the master station to start the data link. OFF : No request ON : Request	×	○
SB0042 (5E4H, b2)	Master station switch data link start acceptance status	Indicates the acceptance status specified for switching data link start from the standby master station to the master station. OFF : Not accepted ON : Accepted	×	○
SB0043 (5E4H, b3)	Master station switch data link start complete status	Indicates the acceptance complete status specified for switching data link start from the standby master station to the master station. OFF : Not completed ON : Completed	×	○
SB0070 (5E7H, b0)	Master station data link status	Indicates the data link status. OFF : Data link by the master station ON : Data link by the standby master station	○	○
SB0071 (5E7H, b1)	Standby master station information	Indicates whether there is standby master station or not. OFF : No ON : Yes	○	○

(2) Link special registers (SW)

The link special registers (SW) relating to the standby master function are as follows.
The figures in parentheses in the number column indicate buffer memory address.

Table 15.5 List of link special registers relating to the standby master function

Number	Name	Description	Availability (○ : available, × : not available)	
			Master station	Standby master station
SW0043 (643H)	Master station switch data link start result	Stores the results of execution of the master station switch data link start instruction by SB0001. 0 : Normal Other than 0 : Stores error code (Refer to Section 13.3)	×	○
SW0073 ※ (673H)	Standby master station number	Stores the standby master station number. 1 to 63 (stations)	○	○

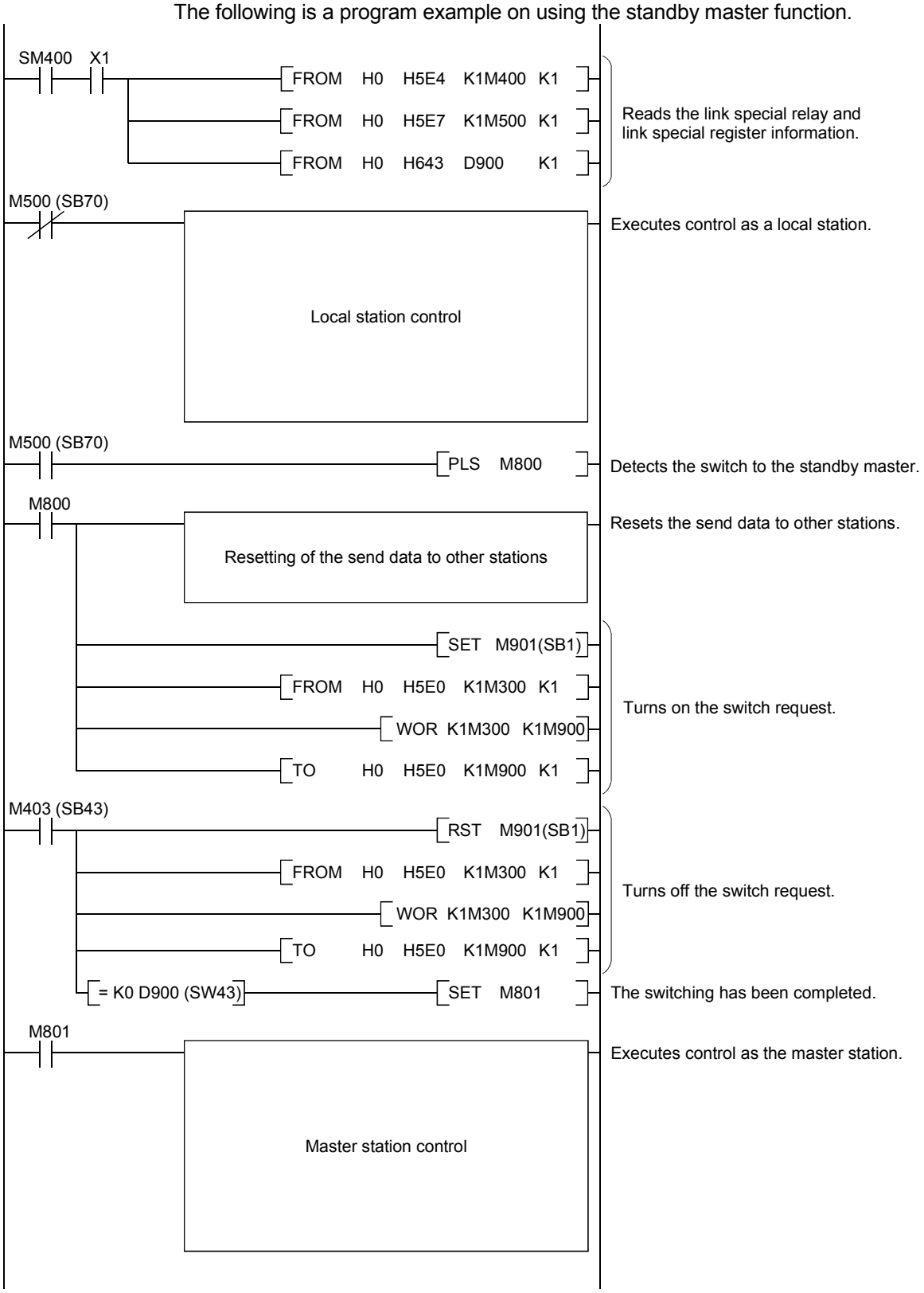
15.5.4 Notes on using the standby master function

The following are the notes on using the standby master function.

① There can be only one standby master station in a data link system.
② The total number of stations is 64 including the standby master station. The number of occupied stations for the standby master station is one or four.
③ Parameter registration to the standby master station is not necessary.
④ If an error is detected at the master station in the initial status (before parameter communication starts), switching to the standby master station will not be executed.
⑤ When the master station becomes faulty, the polling issuing authority will switch automatically to the standby master station, but the cyclic data transmission will not switch. The switch must be enabled using the sequence program. Once the switch has been enabled, the information up to the error detection at the master station will be outputted to each remote station.
⑥ Parameters cannot be updated during the data link by the standby master station.
⑦ When the standby master station becomes faulty, the master station does not return even after recovering its normal operation.
⑧ When the master station becomes faulty and the data link polling issue authority is switched to the standby master station, the standby master station number becomes an error number (Applicable bits of SB0080 and SW0080 to SW0083 are turned ON).
When the standby master station is specified as an error invalid station, error detection can be avoided.

15.5.5 Program example on using the standby master function

The following is a program example on using the standby master function.



15.6 Dedicated Instructions

Transient transmission can be performed to the intelligent device station and local station using dedicated instructions.
Dedicated instructions also facilitate read/write of data with handshake from/to remote devices.
The dedicated instructions that can be used from different types of stations are shown in Table 15.6. Refer to the QnACPU Programming Manual (Special Function Module) for the detail of each instruction.

Table 15.6 List of available dedicated instructions at different stations

Applicable station	Instruction	Description	Availability (○ : available, × : not available)		
			Master station	Local station	Standby master station
Master station, local station	CCL CCLEND	Registers mail box for intelligent device and remote device instructions	○	○	○
	SPCCLR	Issues an interruption instruction to the intelligent device instruction.	○	○	○
	SPCBUSY	Reads status of remote station.	○	○	○
	RIRD	Reads data in the buffer memory of the specified station.	○	○	○
		Reads device data in the CPU of the specified station.	○＊	○＊	○＊
	RIWT	Writes data into the buffer memory of the specified station.	○	○	○
		Writes data into the CPU of the specified station.	○＊	○＊	○＊
Intelligent device station	RIRD	Reads contents in the buffer memory of the specified station.	○	○	○
	RIWT	Writes data into the buffer memory of the specified station.	○	○	○
	RISEND	Writes data with handshake into the buffer memory of the specified station.	○	×	×
	RIRCV	Reads contents with handshake in the buffer memory of the specified station.	○	×	×
	RIFR	Reads contents in the automatic refresh buffer of the specified station. (Random access buffer can be specified.)	○	○	○
	RITO	Writes data into the automatic refresh buffer of the specified station. (Random access buffer can be specified.)	○	○	○

＊ It can be used with software version J (manufactured in Jan., 1998) or later.

POINT

(1) Execute the dedicated instructions during data link.
If any of them is executed in the offline mode, an error does not occur but the dedicated instruction is not completed. After changing the offline mode to the online mode, reset the CPU.
(2) Since the dedicated instructions use the last two bits of RX/RY of the target station as a handshake signal, do not execute write using the TO instruction, etc. during execution of any of the dedicated instructions.

15.7 Communication Instructions (Software Version J and Later)

Data communication with other stations can be performed using communication instructions.
Device read/write with other stations can also be performed. Table 15.7 lists communication instructions.
Refer to the QnACPU Programming Manual (Common Instructions) for the details of each instruction.

Table 15.7 Communication Instruction List

Instruction	Description
SEND	Transmits data (message) to the specified destination station (QnACPU).
RECV	Reads the data (message) sent by a SEND instruction.
READ	Reads word device data of the QnACPU in the specified station to the local station
SREAD	
WRITE	Writes local data to a word device of the QnACPU in the specified station.
SWRITE	
REQ	Transmits a transient request (remote RUN/STOP, etc.) to other stations and makes it executed.

Important

Do not issue the transmission and receiving instruction to the CPU other than QnACPU.

15.8 Remote I/O Net Mode

For the system configured only with the master station and the remote I/O stations, communication can be performed without setting parameters.

15.8.1 Features

When the system is configured only with the master station and the remote I/O stations, the following advantages can be obtained by the use of the remote I/O net mode.

(1) The setting of network parameters can be eliminated.

(2) The data link start request need not be set.

(3) Because the link scan time is shortened, the input/output response speed is increased more than that obtained by the use of the remote net mode.

15.8.2 Software version corresponding to master module and its CPU

Table 15.8 shows the software versions corresponding to the master modules and their CPUs in the remote I/O net mode.

Table 15.8 Master modules and applicable CPU-compatible software versions

Master module, CPU type	Corresponding software version
AJ61QBT11, A1SJ61QBT11	P (manufactured on Sep. 1998) or later
Q2ACPU (S1), Q3ACPU, Q4ACPU	L (manufactured on Sep. 1998) or later
Q2ASCPU (S1), Q2ASHCPU (S1)	T (manufactured on Sep. 1998) or later

15.8.3 Set item

When using the remote I/O net mode, set the following three items.

(1) Set the master station's mode setting switch to 1 (remote I/O net mode).

(2) Set the master station's station number setting switch to the last station number of the remote I/O stations.

(3) Set the automatic refresh parameter using the software package.

15.8.4 Link scan time

The link scan time (LS) when the remote I/O net mode is used can be calculated using the following expression.

LS = BT {25.0 + (NI × 4.0) + (N × 28.0) + (ni × 4.0)} + ST
+ {Number of communication faulty stations × 48 × BT × Number of retries}∗[μs]

BT : Constant (transmission speed)

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
BT	51.2	12.8	3.2	1.6	0.8

NI : Last station number (a multiple of 8)
N : Number of connected stations
ni : Total number of occupied stations
ST : Constant
ST = 200 + (ni × 20)
∗ : Only when there exist communication faulty stations.

The following shows a difference in link scan time between operations using the remote I/O net mode and the remote net mode (conventional mode).

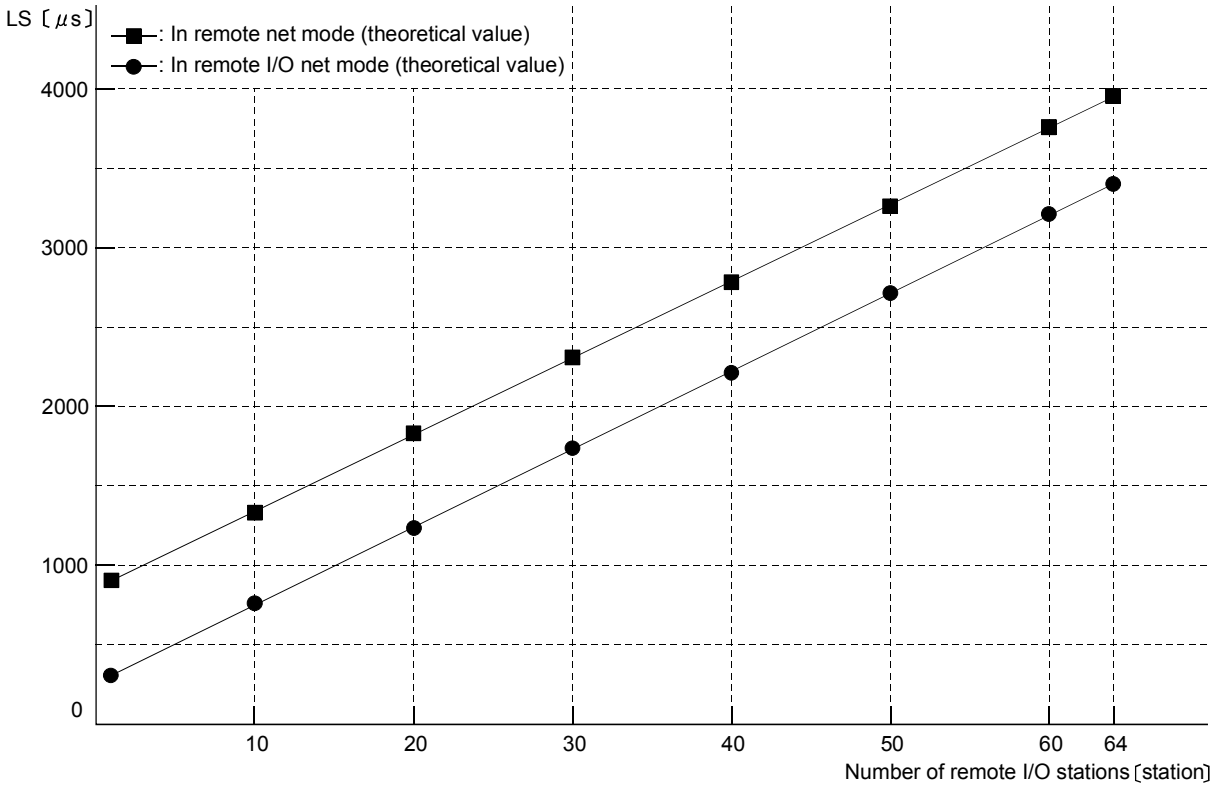


Fig. 15.4 Link scan time

15.8.5 Precautions

Set the remote I/O station numbers sequentially. Failure to do so will detect the omitted station as an error, affecting the link scan time.

15.9 Temporary Error Invalid Station Specification Function

Replacement of modules can be performed online without detecting an error of the corresponding remote station.

15.9.1 I/O status of the temporary error invalid station specification

All of the cyclic transmission data of the station specified as a temporary error invalid station will be refreshed.
When the station specified as a temporary error invalid station becomes faulty, input is retained and output is turned off.

15.9.2 Link special relays/registers (SB, SW) relating to the temporary error invalid station specification function

The link special relays and link special registers relating to the temporary error invalid station specification function are explained.
They are stored in the buffer memory.

(1) Link special relays (SB)

The link special relays (SB) relating to the temporary error invalid station specification function are as follows.
The figures in parentheses in the number column indicate buffer memory address and bit location.

Example: When buffer memory address is 5E0H and bit is 0: (5E0H, b0)

Table 15.9 List of link special relays relating to the temporary error invalid station specification function

Number	Name	Description	Availability (○ : available, × : not available)	
			Master station	Local station
SB0004 (5E0H, b4)	Temporary error invalid station request	Confirms the station which had been specified by SW0003 to SW0007 to temporary error invalid station. OFF : No request ON : Request	○	×
SB0005 (5E0H, b5)	Temporary error invalid station cancelling request	Cancels the station which had been specified by SW0003 to SW0007 from temporary error invalid station. OFF : No request ON : Request	○	×
SB0048 (5E4H, b8)	Temporary error invalid station acceptance status	Indicates the acceptance status of the temporary error invalid station request instruction. OFF : Not executed ON : Instruction accepted	○	×
SB0049 (5E4H, b9)	Temporary error invalid station complete status	Indicates the acceptance complete status of the temporary error invalid station request instruction. OFF : Not executed ON : Temporary error invalid station confirmed	○	×
SB004A (5E4H, b10)	Temporary error invalid station cancelling acceptance status	Indicates the acceptance status of the temporary error invalid station cancelling request instruction. OFF : Not executed ON : Instruction accepted	○	×
SB004B (5E4H, b11)	Temporary error invalid station cancelling complete status	Indicates the acceptance complete status of the temporary error invalid station cancelling request instruction. OFF : Not executed ON : Temporary error invalid station cancelling complete	○	×

(2) Link special registers (SW)

The link special registers (SW) relating to the cut-off station specification function are as follows. The figures in parentheses in the number column indicate buffer memory address.

Table 15.10 List of link special registers relating to temporary error invalid station specifying function

<table>
<tr><th rowspan="2">Number</th><th rowspan="2">Name</th><th rowspan="2">Description</th><th colspan="2">Availability
(○ : available,
× : not available)</th></tr>
<tr><th>Master station</th><th>Local station</th></tr>
<tr><td>SW0003 ∗
(603H)</td><td>Multiple temporary error invalid station specification</td><td>Selects whether to specify multiple temporary error invalid stations.
00 : Specifies multiple stations as indicated in SW0004 to SW0007.
01 to 64 : Specifies a single station from 1 to 64.
※ Specifies the station number used as the temporary invalid station.</td><td>○</td><td>×</td></tr>
<tr><td>SW0004 ∗
(604H)
.
SW0005 ∗
(605H)
.
SW0006 ∗
(606H)
.
SW0007 ∗
(607H)</td><td>Temporary error invalid station specification ∗1</td><td>Specifies the temporary error invalid station.
0: Not specified as a temporary error invalid station.
1: Specified as a temporary error invalid station.
<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW0004</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0005</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0006</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0007</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>52</td><td>51</td><td>50</td><td>49</td></tr></table>1 to 64 in the table indicate station numbers.</td><td>○</td><td>×</td></tr>
<tr><td>SW0049
(649H)</td><td>Temporary error invalid station request result</td><td>Stores the results of execution of the temporary error invalid station request instruction by SB0004.
0 : Normal
Other than 0 : Store error code (See Section 13.3)</td><td>○</td><td>×</td></tr>
<tr><td>SW004B
(64BH)</td><td>Temporary error invalid station cancelling request result</td><td>Stores the results of execution of the temporary error invalid station cancelling request instruction by SB0005.
0 : Normal
Other than 0 : Store error code (See Section 13.3)</td><td>○</td><td>×</td></tr>
<tr><td>SW007C ∗
(67CH)
.
SW007D ∗
(67DH)
.
SW007E ∗
(67EH)
.
SW007F ∗
(67FH)</td><td>Temporary error invalid station specifying status ∗1</td><td>Stores the temporary error invalid station specifying status.
0: Other than temporary error invalid station
1: Temporary error invalid station
<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW007C</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW007D</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW007E</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW007F</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>52</td><td>51</td><td>50</td><td>49</td></tr></table>1 to 64 in the table indicate station numbers.</td><td>○</td><td>○</td></tr>
</table>

∗1 Turns on only the bit for the head station number.

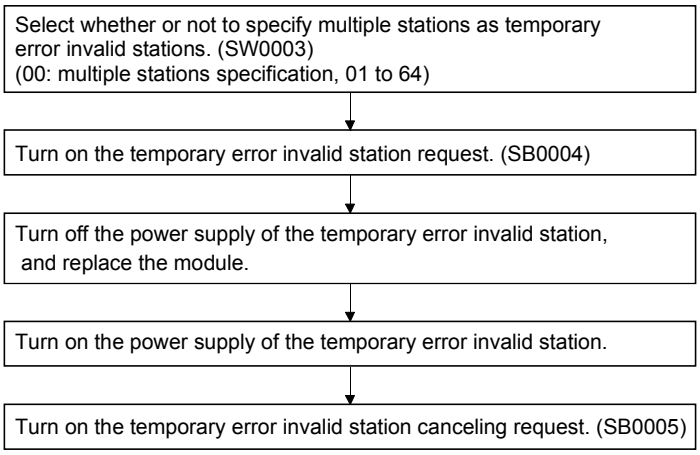
POINT

(1) When both a temporary error invalid request and a cut-off cancelling request are made, the cut-off cancelling request will be given a priority.

(2) For a station that occupies multiple stations, only the head station number becomes valid.

15.9.3 Execution procedure for the temporary error invalid station specification function

The execution procedure for the temporary error invalid station specification function is as follows:



POINT

(1) Even if a temporary error invalid station specification is executed to the station where an error has already occurred, the error information will not be cleared. This specification is valid only when executed to the error occurred after the temporary error invalid station specification has been executed.

(2) "The temporary error invalid request" and "temporary error invalid canceling request" given to the station specified as the error invalid station with parameters become invalid.

15.10 Online Test Function

Parameter test, line test and network test can be conducted from a peripheral device.

15.10.1 Parameter test

Parameters in the actual system are checked for integrity with parameter values set in the SW□IVD-GPPQ/SW□NX-GPPQ/GX Developer parameter mode.
If the parameters in the actual system differs from the set parameter values, an error code is indicated.
For the operation, refer to the SW□IVD-GPPQ/SW□NX-GPPQ Operation Manual (Online) /GX Developer.

15.10.2 Line test

It tests if stations on the CC-Link are communicating normally. If there is a communication faulty station, the head number of the station is displayed in reverse and an error code is indicated.
For the operation, refer to the SW□IVD-GPPQ/SW□NX-GPPQ Operation Manual (Online) /GX Developer.

15.10.3 Network test

Starts and stops the host station, specified station or all stations on the CC-Link.
For the operation, refer to the SW□IVD-GPPQ/SW□NX-GPPQ Operation Manual (Online) /GX Developer.

15.11 Monitor/ Diagnosis Functions

Line monitoring (of host or other stations) and device monitoring are feasible from a peripheral device.

15.11.1 Line monitor (host station)

Monitors items such as the data link status of the host station (connected to the peripheral device).
For the operation, refer to the SW□IVD-GPPQ/SW□NX-GPPQ Operation Manual (Online) /GX Developer.

① Host station
Indicates the type of connected station from master, standby master and local stations.
The station number is also indicated for local station.
② Data link startup status
Data link startup status is displayed.
③ Error status
Line status is displayed. ("Normal" when normal, error name when error.)
④ Link scan time
Indicates the maximum, minimum and current values of link scan time.

15.11.2 Line monitor (other stations)

Monitors items such as the data link status of the host station (connected to the peripheral device).
For the operation, refer to the SW□IVD-GPPQ/SW□NX-GPPQ Operation Manual (Online) /GX Developer.

① Station
Head number of each station is displayed.
② Reserved station setting
Indicates whether reserved station is set or not if parameters are set from a peripheral device.
"○": Reserved stations set
" ": No reserved station set
③ Error invalid station setting
Indicates whether error invalid station is set or not if parameters are set from a peripheral device.
"○": Error invalid stations set
" ": No error invalid station set
④ Station type
Indicates the station type as shown below if parameters are set from a peripheral device.
"Local": Local station
"Standby": Standby master station
"I/O": Remote I/O station
"Device": Remote device station
⑤ Number of occupied stations
Indicates number of occupied stations if parameters are set from a peripheral device.
⑥ Status
Indicates data link status.
⑦ Transient error
Indicates existence of error during transient transmission.
"○": Error
" ": No error

15.11.3 Device monitor

Device status is monitored by specifying the head station number or device name (RX, RY, RWw or RWr).
For the operation, refer to the SW□IVD-GPPQ/SW□NX-GPPQ Operation Manual (Online) /GX Developer.

16. COMMUNICATION WITH INTELLIGENT DEVICES (FUNCTION VERSION B OR LATER)

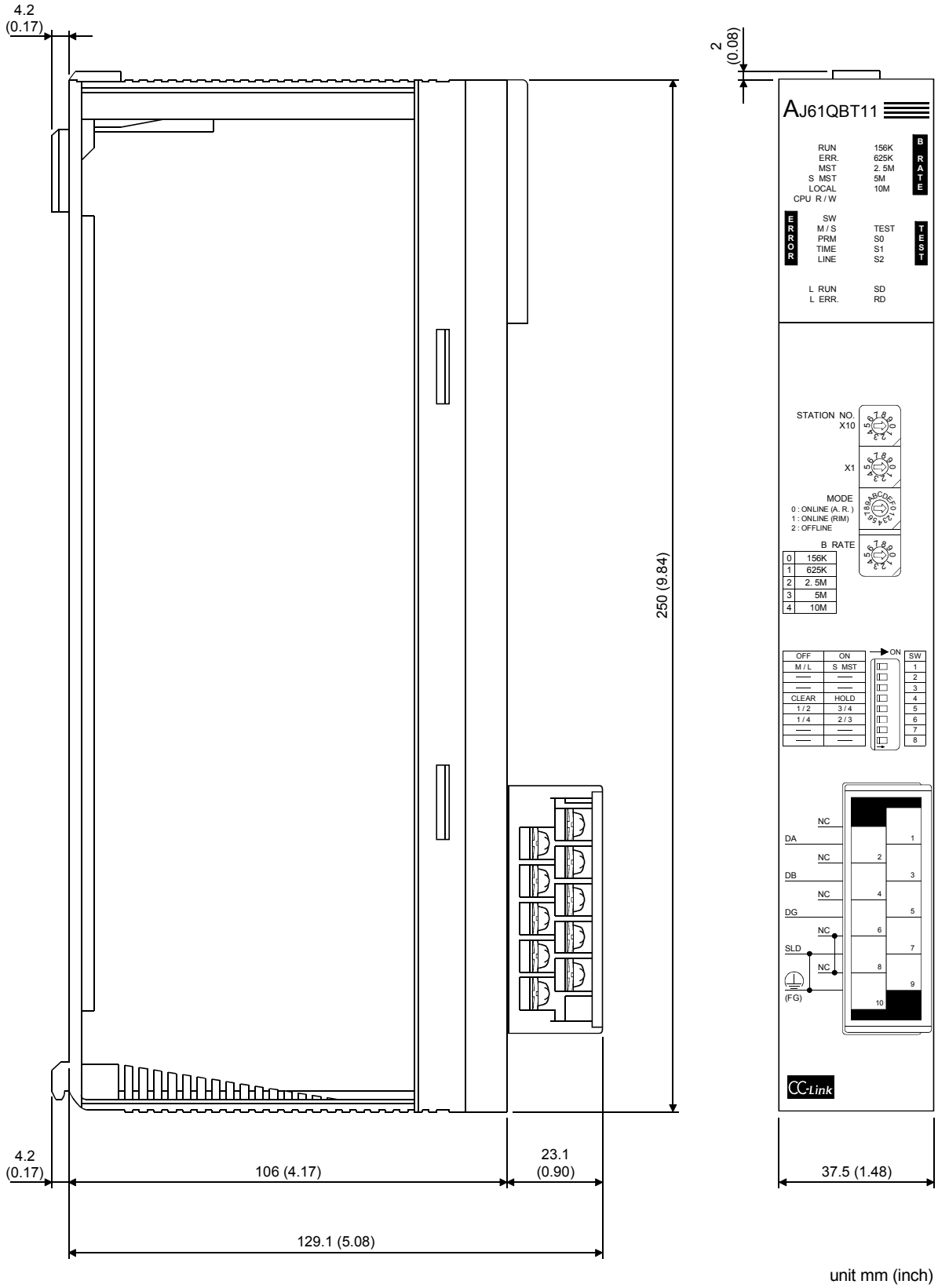
The method for communication between the master station and the intelligent device stations varies depending on the intelligent device station.
For the communication between the master station and the intelligent device stations, refer to the applicable intelligent device station operation manual.

MEMO

APPENDICES

Appendix 1 External Dimensions

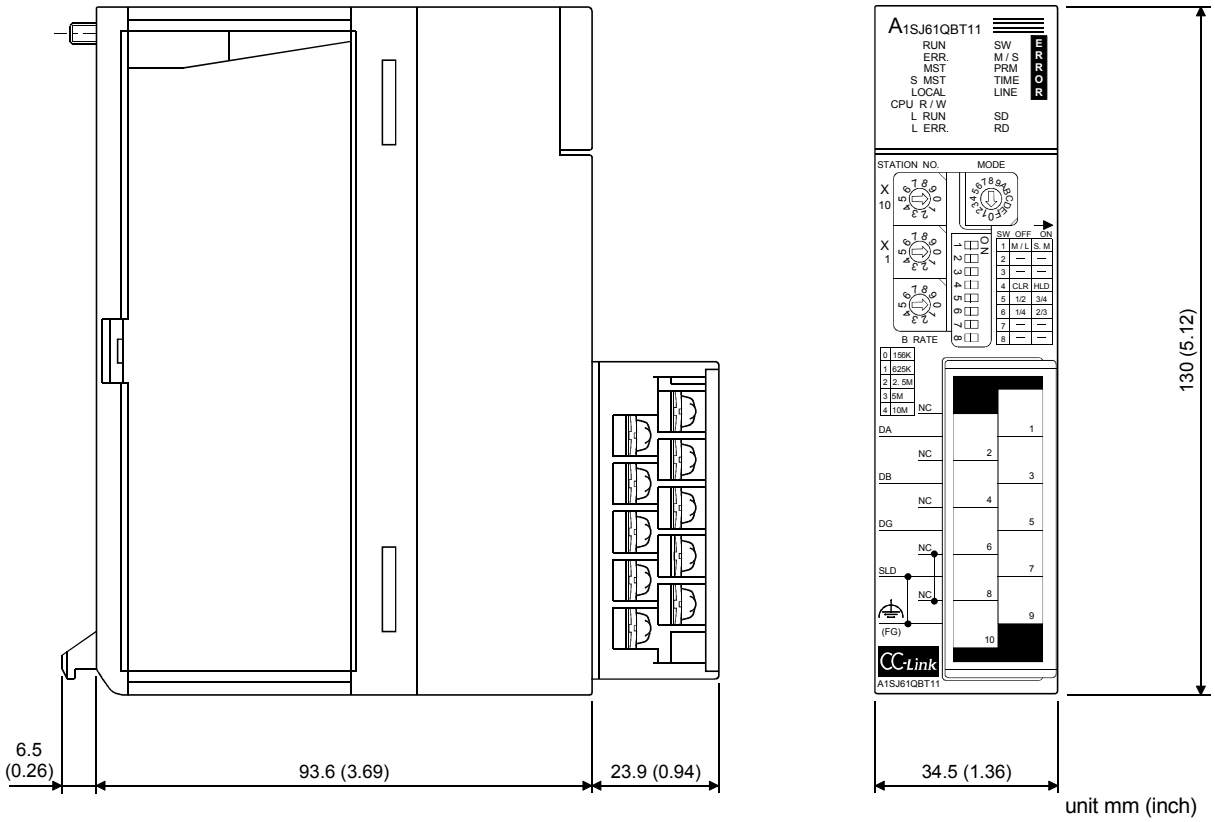
Appendix 1.1 AJ61QBT11



unit mm (inch)

A

Appendix 1.2 A1SJ61QBT11



Appendix 2 Parameter Setting Sheet

Item	Setting range	Buffer memory address	Remark	Default value	Setting value
Number of linked modules	1 to 64	1H	–	64	
Number of retries	1 to 7	2H	–	3	
Number of automatic return modules	1 to 10	3H	–	1	
Standby master station specification	0 to 63 (0: No specification)	4H	–	0	
Operation when CPU down	0: stop 1: continue	6H	–	0 (stop)	
Delay time setting	Set 0.	8H	–	0	
Reserved station specification	Turn on the corresponding bit for station to reserve.	10H	Station No. 16 to 1	0000H	
		11H	Station No. 32 to 17	0000H	
		12H	Station No. 48 to 33	0000H	
		13H	Station No. 64 to 49	0000H	
Invalid station specification	Turn on the corresponding bit for station to invalidate.	14H	Station No. 16 to 1	0000H	
		15H	Station No. 32 to 17	0000H	
		16H	Station No. 48 to 33	0000H	
		17H	Station No. 64 to 49	0000H	
Station information	b15 to b12 (station type) 0: remote I/O station 1: remote device station 2: intelligent device station, local station b11 to b8 (number of occupied stations) 1: occupies one station 2: occupies two stations 3: occupies three stations 4: occupies four stations b7 to b0 (station number) 01H to 40H (1 to 64)	20H	1st module	0101H	
		21H	2nd module	0102H	
		22H	3rd module	0103H	
		23H	4th module	0104H	
		24H	5th module	0105H	
		25H	6th module	0106H	
		26H	7th module	0107H	
		27H	8th module	0108H	
		28H	9th module	0109H	
		29H	10th module	010AH	
		2AH	11th module	010BH	
		2BH	12th module	010CH	
		2CH	13th module	010DH	
		2DH	14th module	010EH	
		2EH	15th module	010FH	
		2FH	16th module	0110H	
		30H	17th module	0111H	
		31H	18th module	0112H	
		32H	19th module	0113H	
		33H	20th module	0114H	
		34H	21st module	0115H	
		35H	22nd module	0116H	
		36H	23rd module	0117H	
		37H	24th module	0118H	
		38H	25th module	0119H	
		39H	26th module	011AH	
		3AH	27th module	011BH	
		3BH	28th module	011CH	

Item	Setting range	Buffer memory address	Remark	Default value	Setting value
Station information		3CH	29th module	011DH	
		3DH	30th module	011EH	
		3EH	31st module	011FH	
		3FH	32nd module	0120H	
		40H	33rd module	0121H	
		41H	34th module	0122H	
		42H	35th module	0123H	
		43H	36th module	0124H	
		44H	37th module	0125H	
		45H	38th module	0126H	
		46H	39th module	0127H	
		47H	40th module	0128H	
		48H	41st module	0129H	
		49H	42nd module	012AH	
		4AH	43rd module	012BH	
		4BH	44th module	012CH	
		4CH	45th module	012DH	
		4DH	46th module	012EH	
		4EH	47th module	012FH	
		4FH	48th module	0130H	
		50H	49th module	0131H	
		51H	50th module	0132H	
		52H	51st module	0133H	
		53H	52nd module	0134H	
		54H	53rd module	0135H	
		55H	54th module	0136H	
		56H	55th module	0137H	
		57H	56th module	0138H	
		58H	57th module	0139H	
		59H	58th module	013AH	
		5AH	59th module	013BH	
		5BH	60th module	013CH	
		5CH	61st module	013DH	
		5DH	62nd module	013EH	
		5EH	63rd module	013FH	
		5FH	64th module	0140H	

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

IB (NA)-66722-L

CC-Link System Master/Local Module Type AJ61QBT11/A1SJ61QBT11 User's Manual

MODEL	A(1S)J61QBT11-U-E
MODEL CODE	13J873
IB(NA)-66722-L(1211)MEE	

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